

SITE CHARACTERIZATION REPORT STIMSON LUMBER COMPANY COOLING POND

Missoula County, Montana



Prepared For:

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EXECUTIVE SUMMARY

This document presents the results of a site investigation to characterize sediments beneath a cooling pond at the Stimson Lumber Company Mill located in Bonner, Montana. The investigation was conducted by Olympus Technical Services, Inc. under contract with the Montana Department of Environmental Quality. The objective of the investigation was to collect sediment samples from the cooling pond and analyze the samples for a wide variety of potential contaminants to assess contaminant presence and/or contaminant distribution in the pond. The analytical data may be used to guide future discussions about the fate of the pond sediments.

The cooling pond (Site) is located adjacent to the Blackfoot River at an approximate elevation of 3,160 feet on the north border of the Stimson Lumber Company Mill property. Based on historical photographs, the cooling pond was constructed in the former channel of the Blackfoot River. The pond has approximate dimensions of 490 feet long by 60 feet wide with a surface area of approximately 29,100 square feet. The depth of water is variable, ranging from less than one foot at the eastern edge of the pond to approximately nine feet at the western area of the pond. The cooling pond collects water from various sources at the Mill including boiler blow-down water, Non Contact Cooling Water (NCCW), and surface runoff. Water enters the pond from overland flow, and from pipes and an open discharge stream located in the western area of the pond. Water from the pond discharges to the Blackfoot River from an outlet located in the eastern area of the pond.

The field sampling program included the collection of sediment samples from four soil borings advanced at selected areas of the pond. The borings, labeled B1, B2, B3, and B4, were advanced using a hydraulic core drill mounted on a floating aluminum drill platform (cover photo). Continuous soil sampling was performed at two-foot intervals from the sediment/surface water interface (varying from 3.5 to 9 feet below the water surface) to a depth of sampler refusal (21.5 to 25 feet below the water surface). The soil borings were located with the intent to characterize sediment at the pond outlet (B1), central pond area (B2), and pond influent areas (B3 and B4).

The collected samples were shipped by overnight courier, using chain of custody procedures, to Northern Analytical Laboratories in Billings, Montana. As historical uses and discharges to the cooling pond are unknown, an extensive range of potential contaminants were assessed. Selected samples were analyzed for the following parameters and compounds: pH; moisture content, Eh (oxidation-reduction potential); volatile petroleum hydrocarbons (VPH); extractable petroleum hydrocarbons (EPH); volatile organic compounds (VOC); semivolatile organic compounds (SVOC); polychlorinated biphenyls (PCB), chlorinated pesticides, chlorinated herbicides, and total metals. In addition, composite samples from each boring were analyzed for hazardous waste characteristics using the toxic characteristic leaching procedure (TCLP).

Concentrations of compounds detected in the laboratory analyses of the sediment samples were compared to project screening levels that were established based on classification as a Resource Conservation and Recovery Act (RCRA) hazardous waste, or to risk-based screening levels developed or established by the Montana Department of Environmental Quality or the United States Environmental Protection Agency (EPA).

The most notable contaminants in the pond sediments are PCBs and extractable petroleum hydrocarbons as C11 to C22 range aromatics. Following is a summary of the compounds detected at concentrations exceeding the project screening levels.

- EPH (dry weight) - C₁₁ to C₂₂ Aromatics: detected at concentrations from 180 milligrams per kilogram (mg/Kg) to 490 mg/Kg in samples collected from soil borings B1, B2, B3, and B4 (screening level of 100 mg/Kg);
- EPH (dry weight) - Total Extractable Hydrocarbons: detected at a concentration of 7,400 mg/Kg in a sample collected from soil boring B2 and at a concentration of 5,900 mg/kg in a sample collected from soil boring B3 (screening level of 5,000 mg/Kg);
- PCBs (dry weight) - Aroclor-1254: detected at concentrations ranging from 0.55 mg/Kg to 65 mg/Kg in samples collected from soil borings B1, B2, B3, and B4 (screening level of 0.11 mg/Kg); and
- Total Metals (dry weight) - Manganese: detected at concentrations of 2,740 mg/Kg and 3,010 mg/Kg in samples collected from soil boring B4 (screening level of 1,800 mg/Kg).

In addition, due to sample dilutions and/or other necessary laboratory corrections or equipment limitations, laboratory detection limits for the following compounds in some or all of the samples exceeded the project screening levels:

- VPH (dry weight) - methyl tert-butyl ether;
- VOCs - 1,2-Dibromomethane, Acronitrile, and tert-1,4-Dichloro-2-butene;
- SVOCs- 3,3-Dichlorobenzidine, Hexachlorobenzene, N-Nitrosodimethylamine, and N-Nitrosodi-n-propylamine;
- Chlorinated Pesticides - Aldrin, Dieldrin, Heptachlor epoxide, Toxaphene; and
- PCBs - Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor 1254, and Aroclor 1260.

The data indicate that the PCBs and petroleum hydrocarbons are the primary contaminants and they are distributed throughout the pond sediments. Petroleum hydrocarbon compounds and PCBs were detected in every sample that was analyzed at concentrations above their respective screening levels. The data did not indicate either areal or vertical "hot spots" or source areas occur within the pond sediment. Hydrocarbons present in the sediment have boiling points in the range of lubricating and hydraulic oils, although they are not entirely consistent with those of reference lubricating and hydraulic oil chromatograms used by Northern.

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1.0 INTRODUCTION

This document presents the results of a site investigation to characterize sediments at a cooling pond at the Stimson Lumber Company Mill located in Bonner, Montana. The investigation was conducted by Olympus Technical Services, Inc. (Olympus) for the Montana Department of Environmental Quality (DEQ). The investigation was conducted in general accordance with *Sampling and Analytical Plan for Sediment Characterization at the Stimson Lumber Cooling Pond* (Olympus, 2006). Site work was performed from March 28 through 31, 2006.

The purpose of the investigation was to collect sufficient physical and analytical data to assess potential contaminants and potential contaminant distribution in the cooling pond sediments.

2.0 PROJECT DESCRIPTION

The Stimson Lumber Company's Bonner Mill (Mill) is a plywood and lumber processing facility located in Bonner, Missoula County, Montana. The location of the Mill and cooling pond are shown on [Figure 1](#). The cooling pond (Site) is located adjacent to the Blackfoot River at an approximate elevation of 3,160 feet on the north border of the Mill property. Based on historical photographs, the cooling pond was constructed within the former channel of the Blackfoot River.

The pond has approximate dimensions of 490 feet long by 60 feet wide with a surface area of approximately 29,100 square feet. The depth of water is variable, ranging from less than one foot at the eastern edge of the pond to approximately nine feet at the western area of the pond. The cooling pond collects water from various sources at the Mill including boiler blow-down water, Non Contact Cooling Water (NCCW), and surface runoff. Water discharged from the Mill enters the pond from pipes and an open stream located in the western area of the pond. Water from the pond discharges to the Blackfoot River from an outlet located in the eastern area of the pond.

2.1 Project Objectives

Historical uses and Mill discharges to the cooling pond are unknown. The objective of the Site Characterization was to collect sediment samples from the cooling pond and analyze the samples for a wide variety of potential contaminants to assess contaminant and/or contaminant distribution in the pond sediments. The analytical data may be used to guide potential future removal, transport, and disposal of the pond sediments.

2.2 Site Setting

2.2.1 Location and Topography

The Mill is located in the Blackfoot River valley in the NW1/4, Section 22, Township 13 North, Range 18 West of the Montana Principal Meridian at Latitude 47° 00' 24.3" North, Longitude 109° 20' 53.5" West. Regional geography is characterized by steep mountainous terrain with vertical relief of up to 3,000 feet. The cooling pond is located on a bench above the south bank of the Blackfoot River at an elevation of approximately 3,160 feet above mean sea level. An approximate 25-foot wide embankment with an access road at its top separates the pond from

the Blackfoot River. The pond is located approximately five to eight feet below the top of the embankment, and the Blackfoot River is located approximately 20 feet below the top of the embankment. [Figure 2](#) shows an aerial photograph of the Site and nearby features.

2.2.2 Surface Water Hydrology

The Blackfoot River drains an area of approximately 2,290 square miles upstream from the Site. The Site is located approximately 5,580 feet upstream (east) of the Blackfoot River's confluence with the Clark Fork River. The USGS Bonner gaging station on the Blackfoot River is located approximately 5.5 miles upstream of the Site. Stream flow records at the gaging station for the periods 1899 to 1905 and 1940 to present show that flows have ranged from approximately 200 to 19,200 cubic feet per second.

2.2.3 Geology

The geology in the region has been summarized on a USGS geologic map (Lewis, 1998). The area is characterized by folded and faulted sedimentary rocks of Pre-Cambrian age. The structures are related to Sevier style thrust faults that trend northwest-southeast. The McNamara Formation, Bonner Quartzite, Mount Shields Formation, and Shepard Formation of the Belt Supergroup form the local bedrock at the Site. These formations are composed of interbedded argillite, siltite, and quartzite. The bedrock is exposed on the north bank of the Blackfoot River north from the Site. Quaternary age alluvial sediments and anthropogenic fill overlie the bedrock at the Site.

2.2.4 Hydrogeology

Information regarding site hydrogeology was obtained from the Montana Bureau of Mines and Geology (MBMG) Ground Water Information Center (GWIC). There are 183 GWIC registered wells located within a one mile radius of the Site. The nearest registered wells and their reported total depth and static water level are shown on [Figure 3](#); however, the well locations in GWIC are often approximate and cannot be relied on without field checking.

GWIC provided drilling logs for some of the wells located within a one mile radius of the Site; available logs indicate that the wells are completed in alluvial clay, sand and gravel. The maximum total depth of the wells located within one mile of the Site is reported to be 240 feet below ground surface (BGS), and the median total depth of the wells is reported to be 95 feet BGS. The maximum depth to static water level of the wells is reported to be 118 feet BGS, and the median depth to static water level of the wells is reported to be 48 feet BGS. The minimum total depth and minimum depth to static water levels of the wells was reported as zero; however, if no data are available the minimum depths are reported as zero, and the minimum depth data are unreliable.

Ground water quality data for a ground water sample collected from one of the Stimson Lumber Company wells was obtained from GWIC. The sample was collected on November 14, 2000 by MBMG staff and analyzed for major ions, trace elements, and basic water quality parameters. The analytical data for the ground water sample were compared to federal and state drinking water quality standards. Concentrations of analytes and other water quality parameters were

detected at concentrations or levels below applicable water quality standards. [Appendix A](#) includes a copy of the ground water quality data obtained from the GWIC.

2.2.5 Land Use and Population

Surrounding land is used for commercial and residential purposes. The Stimson Lumber Company Bonner Mill, consisting of warehouses, buildings, and log and chip storage areas, is located south of the Site. The nearest residences are located on or adjacent to Montana Highway 200, located approximately 1,000 feet southeast of the Site. Approximately 61,000 people live within a 20-mile radius of the Site.

2.2.6 Site Development History

Information regarding development of the Site was obtained from past and current Stimson employees. The employees reported that the pond was built sometime after 1905 and before 1940. They reported that the pond used to be periodically dredged, and that the practice of placing logs in the pond prior to debarking continued into the early 1970s.

3.0 SITE ASSESSMENT

The primary objective of this assessment was to assess potential contaminants contained in sediments at the Mill's cooling pond. The *Sampling and Analytical Plan for Sediment Characterization at the Stimson Lumber Cooling Pond* (SAP; Olympus, 2006) includes a Field Sampling Plan (FSP) describing the constituents of concern, data quality objectives, study boundaries, sampling plan and protocols, and field sampling procedures. The SAP includes a Quality Assurance Project Plan (QAPjP) that identifies project management, quality assurance objectives, sampling and chain of custody protocols, and data evaluation and reporting. The SAP also includes a Laboratory Analytical Plan (LAP) describing the laboratory requirements for sample analyses and quality assurance requirements.

3.1 Field Sampling Plan and Field Activities

Project field activities and sampling were conducted in general accordance with the SAP and Olympus' Standard Operating Procedures (Appendix B). A summary of field activities and sampling, including any deviations from the SAP, are detailed as follows.

Four soil borings were located at areas to characterize sediment at the pond outlet (B1), central pond area (B2), and pond influent areas (B3 and B4) as shown on [Figure 4](#). The borings were advanced by Salisbury and Associates, Inc. of Spokane, Washington using a hydraulic core drill mounted on a floating aluminum drill platform (cover photo). A piston-driven Shelby tube sampler was used to collect continuous soil samples at two-foot intervals from the sediment/water interface to the depth of sampler refusal. Split spoon sampling was attempted at all borings following Shelby tube refusal; however, limited or no sample recovery was obtained using the split spoon sampler. Soil boring logs that include boring and sampling information, sample descriptions, and field observations, are provided in [Appendix C](#).

Sampling equipment decontamination procedures were followed as outlined in the SAP. All equipment was decontaminated before collection of each sample. Equipment decontamination consisted of a tap water rinse, a soap and tap water wash, a dilute nitric acid rinse (ten parts distilled/deionized water to one part concentrated nitric acid), and a deionized water rinse followed by air drying. All equipment was decontaminated before leaving the site to prevent off-site transport of contaminants.

Samples were identified, labeled, described, preserved, and handled as outlined in the SAP. A sample numbering system was used to identify the project site, the sample medium, and the specific sample location. The sample identifier for each sample included the boring number, the letter S (to indicate that the sample media is soil) and a number sequentially assigned for each boring. For example, the uppermost sample collected from boring B1 was assigned sample number B1-S-1. Sample locations were described in the field logbook and plotted on the site sketch. All samples were labeled in the field and documented with the date and time of sample collection, the sample number, any preservatives used, and the sampler's initials. A permanent marker was used for labeling, and labels were covered with clear tape and sealed and tagged. In a deviation from the SAP, requested analyses were not written on the individual sample labels. At their request, selected sediment samples from each boring were prepared by Olympus and provided to Stimson in containers provided by Stimson.

Samples were preserved and handled as outlined in the SAP. All samples were preserved immediately upon sample collection, and stored in coolers with ice. Chain-of-custody records were kept with the samples, and custody seals were placed on the coolers prior to shipment to the laboratory. Copies of the chain-of-custody records are included with the analytical reports in [Appendix D](#).

Field activities were documented as outlined in the SAP. All field sampling activities and non-sampling data collection was recorded in a site log book. A copy of the field notes is provided in [Appendix E](#). The recorded information included weather conditions, field crew members, visitors to the site, samples collected, the date and time of sample collection, procedures used, any field data collected, and any deviations from this SAP.

Post sampling activities followed procedures and guidelines outlined in the SAP, with the exception of disposal of potentially contaminated fluids. In a deviation from the SAP, potentially contaminated fluids generated during field activities and equipment decontamination were disposed into the cooling pond. Collected samples were shipped in ice-cooled coolers, using chain of custody protocol, via overnight carrier (Greyhound Bus) to Northern Analytical Laboratories in Billings, Montana. Custody seals were present on the coolers.

Equipment rinsate blanks were prepared as outlined in the SAP. The equipment rinsate blanks were collected by pouring laboratory-supplied deionized water through or over decontaminated sampling equipment and into laboratory-supplied sample containers. Following laboratory instructions, preservatives were added by Olympus to appropriate containers. Rinsate blanks were analyzed for all Project constituents of concern with the exception of hazardous waste characteristics using TCLP. In a deviation from the SAP, Olympus did not collect field duplicate samples for analyses by Olympus' laboratory. With the concurrence of DEQ and Stimson, sediment recovered from a four-foot interval at each boring was divided into six eight-ounce sampling jars, with three of the jars provided to Stimson as noted above. The samples provided to Stimson were scheduled to be analyzed by Energy Laboratories, Inc. in Billings, Montana, and the analytical results used by Olympus as field duplicates. Field duplicate samples were designated with a "D" at the end of the sample identification number.

3.2 Soil Borings

Four soil borings were advanced at different areas of the mill pond, as shown on [Figure 4](#), in an attempt to characterize the sediment at the pond. Boring logs are provided in Appendix C and the sample identifications, intervals, and list of laboratory analyses performed as summarized in Table 1. A brief description of the four soil borings and sample collection activities are as follows.

Soil Boring SB-1

Soil boring SB-1 was advanced on March 28, 2005, at a location near the east end of the pond approximately 28 feet south of the pond outlet pipe (Figure 4). Continuous sediment samples were collected at two-foot intervals from the water-sediment interface at nine feet below the water surface (BWS) to a depth of 19 feet BWS. Samples were collected using a piston-driven Shelby tube. Sediment collected from 11 to 15 feet was placed into six eight-ounce jars, and split with Stimson. Following Shelby tube refusal at 19 feet, split spoon sampling was attempted, with little sample recovery. The boring was then advanced to 21 and 23 feet BWS, with split spoon sampling attempted following each boring advancement, with little sample recovery. Based on the advancement of the core drill, the driller reported that the interval from 19 to 25 feet likely consisted of wood.

Soil Boring SB-2

Soil boring SB-2 was advanced on March 29, 2005, at the center (north-south) of the pond at a location east and downstream of the easternmost influent pipe as shown on [Figure 4](#). Continuous sediment samples were collected at two-foot intervals from the water-sediment interface at 7.5 feet BWS to a depth of 17.5 feet BWS. Samples were collected using a piston-driven Shelby tube. Sediment collected from 9.5 to 13.5 feet was placed into six eight-ounce jars, and split with Stimson. Following Shelby tube refusal at 17.5 feet, split spoon sampling was attempted, with little sample recovery. The boring was then advanced to 19.5 feet BWS, and split spoon sampling was attempted with little sample recovery. Based on the gravel recovered at 17.5 and 19.5 feet BWS, the base of the soil boring appeared to extend beyond the pond sediments.

Soil Boring SB-3

Soil boring SB-3 was advanced on March 29, 2005, in the center (north-south) of the pond at a location between two influent pipes as shown on [Figure 4](#). Continuous sediment samples were collected at two-foot intervals from the water-sediment interface at 7.5 feet BWS to a depth of 17.5 feet BWS. Samples were collected using a piston-driven Shelby tube. Sediment collected from 7.5 to 11.5 feet was placed into six eight-ounce jars, and split with Stimson. Following Shelby tube refusal at 17.5 feet, split spoon sampling was attempted with little sample recovery. The boring was then advanced to 19.5 feet BWS, and split spoon sampling was attempted with no sample recovery. The lithology at the base of the boring was not determined.

Soil Boring SB-4

Soil boring SB-4 was advanced on March 30, 2005, in the center (north-south) of the pond east of two active influent points (discharge pipe and stream) at the closest location to the influent points without barge grounding as shown on [Figure 4](#). Continuous sediment samples were collected at two-foot intervals from the water-sediment interface at 3.5 feet BWS to a depth of

19.5 feet BWS. Samples were collected using a piston-driven Shelby tube. Sediment collected from 3.5 to 7.5 feet was placed into six eight-ounce jars, and split with Stimson. Following Shelby tube refusal at 19.5 feet, split spoon sampling was attempted with little sample recovery. The boring was then advanced to 21.5 feet BWS, and split spoon sampling was attempted with no sample recovery. Following boring abandonment, the driller reported that an approximate six-inch section of rock was recovered in the drill casing, indicating the base of the soil boring appeared to extend deeper than the pond sediments.

3.3 Analytical Results

Sediment and QA/QC samples were shipped, using chain of custody procedures, to Northern Analytical Laboratories (Northern) in Billings, Montana. Field duplicates were submitted by Stimson Lumber Company to Energy Laboratories, Inc. in Helena, Montana and the analyses were conducted by Energy Laboratories, Inc. at their Billings, Montana laboratory. Requested analyses for the samples were not included on the chains of custody accompanying the samples; analytical requests for selected soil samples were made following consultation between DEQ, Olympus, and Northern and were determined based on sample location, sample amounts, and sample composite determinations. A list of analytical methods is provided in [Table 1](#). [Table 2](#) presents sample identifications, collection dates, sampling intervals, and laboratory analyses performed for all samples collected during the site investigation. [Table 3](#) presents the project screening levels (where applicable) and the laboratory analyses for pH, Eh (oxidation-reduction potential), moisture content, volatile petroleum hydrocarbons (VPH), and extractable petroleum hydrocarbons (EPH) for selected soil samples, duplicate samples, and rinsate samples. [Table 4](#) presents the project screening levels and the laboratory analyses for volatile organic compounds for selected soil samples, duplicate samples, and rinsate sample. [Table 5](#) presents the project screening levels and the laboratory analyses for semivolatile organic compounds for selected soil samples, duplicate samples, and rinsate sample. [Table 6](#) presents the project screening levels and the laboratory analyses for chlorinated pesticides and chlorinated herbicides for selected soil samples, duplicate samples, and rinsate samples. [Table 7](#) presents the project screening levels and the laboratory analyses for total metals and polychlorinated biphenyls (PCB) for selected soil samples, duplicate samples, and rinsate samples. [Table 8](#) presents the project screening levels and the laboratory analyses for the RCRA characteristics analyses, including reactivity (Cyanide as HCN and Sulfide as H₂S) and TCLP (metals, VOCs, SVOCs, pesticides and herbicides) for selected composite samples from each boring. Laboratory analytical reports for these analyses and the laboratory QA/QC data are included in [Appendix D](#).

Olympus reviewed the laboratory reports to assess whether the data met quality control objectives as outlined in the SAP. Olympus' QA/QC reports for the laboratory analyses are provided in [Appendix F](#). Based on this review the data are considered valid.

Concentrations of compounds detected in the laboratory analyses of the sediment samples were compared to project screening levels that were established based on classification as a RCRA hazardous waste, or to risk-based screening levels developed or established by DEQ or EPA. Following is a summary of the compounds detected at concentrations exceeding the project screening levels.

- EPH (dry weight) - C₁₁ to C₂₂ Aromatics: detected at concentrations from 180 milligrams per kilogram (mg/Kg) to 490 mg/Kg in samples collected from soil borings B1, B2, B3, and B4 (screening level of 100 mg/Kg);

- EPH (dry weight) - Total Extractable Hydrocarbons: detected at a concentration of 7,400 mg/Kg in a sample collected from soil boring B2 and at a concentration of 5,900 mg/kg in a sample from soil boring B3 (screening level of 5,000 mg/Kg);
- PCBs (dry weight) - Aroclor-1254: detected at concentrations ranging from 0.55 mg/Kg to 65 mg/Kg in samples collected from soil borings B1, B2, B3, and B4 (screening level of 0.11 mg/Kg); and
- Total Metals (dry weight) - Manganese: detected at a concentration of 2,740 mg/Kg and 3,010 mg/Kg in samples collected from soil boring B4 (screening level of 1,800 mg/Kg).

Northern compared the EPH chromatograms to reference chromatograms for gasoline, Stoddard solvent, JP-4, jet fuel A, #1 diesel, #2 diesel, #4 diesel, #5 diesel, weathered #2 diesel fuel, crude oil, lubricating oil, and hydraulic oil. Their report is provided with the analytical results in [Appendix D](#). Northern concluded that the hydrocarbons present in the samples have boiling points in the range of lubricating and hydraulic oils. The boiling point ranges are not entirely consistent with those of the components of hydraulic and lubricating oil references, but they are greatly different than the boiling point ranges of the hydrocarbons present in the other reference chromatograms. Northern also concluded that the series of peaks eluting the 20 to 24 minute range are attributable to the PCBs present in the samples.

In addition, due to sample dilutions and/or other necessary laboratory corrections or equipment limitations, laboratory detection limits for the following compounds in some or all of the project samples exceeded the project screening levels:

- VPH (dry weight) - methyl tert-butyl ether;
- VOCs - 1,2-Dibromomethane, Acronitrile, and tert-1,4-Dichloro-2-butene;
- SVOCs- 3,3-Dichlorobenzidine, Hexachlorobenzene, N-Nitrosodimethylamine, and N-Nitrosodi-n-propylamine;
- Chlorinated Pesticides - Aldrin, Dieldrin, Heptachlor epoxide, Toxaphene; and
- PCBs (dry weight) - Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor 1254, and Aroclor 1260.

4.0 CONCLUSIONS

The objective of this site characterization was to collect sufficient data to assess potential contaminant presence and distribution in the pond sediments. Four borings were drilled along the center-line axis of the pond at locations near visible inlet pipes. These locations were selected to assess the potential for the inlets to act as unique contaminant sources.

The depth of water in the pond varied from less than one foot at boring B4, located near the west end of the pond, to nine feet at boring B1, located near the east end of the pond. The sediments in the pond are fairly uniform in appearance. They consist of brown, organic-rich silt and clays that extended to depths ranging from 17.5 to 19 feet below the pond water surface. The organic silt and clay pond sediments are underlain by a woody layer that appears to primarily consist of branches and/or logs that extend to depths of approximately 19 to 25 feet

below the water surface. The woody debris is underlain by sand and gravel that define the base of the pond sediments.

Sediment samples were collected from the organic rich clay and silt intervals. The sample recovery from the woody debris and sand/gravel intervals was insufficient for analytical purposes. The samples were analyzed for pH, Eh, VOCs, SVOCs, VPH, EPH, pesticides, herbicides, PCBs, total metals, and reactivity. Selected samples were composited and analyzed for RCRA hazardous waste characteristics, including TCLP VOCs, TCLP SVOCs, TCLP metals, TCLP pesticides, and TCLP herbicides.

The only constituents detected in the sediments that exceeded project screening levels were PCBs, C11-C22 range aromatic petroleum hydrocarbons, and manganese. The manganese screening level was exceeded in only one sample, which was collected from boring B4. The C11-C22 range aromatic petroleum hydrocarbons and PCB screening levels were exceeded in all fourteen sediment samples. The C11-C22 range aromatic petroleum hydrocarbon concentrations ranged from 260 to 664 mg/kg while the PCB concentrations ranged from 0.22 to 65 mg/kg. The data did not indicate that either areal or vertical "hot spots" or source areas occur within the pond sediment. Hydrocarbons present in the sediment have boiling points in the range of lubricating and hydraulic oils, although they are not entirely consistent with those of reference lubricating and hydraulic oil chromatograms used by Northern.

5.0 LIMITATIONS

Olympus performed the services documented in this report in a manner consistent with generally accepted principles and practices for the nature of the work completed in the same or similar localities, at the time the work was performed. No other warranty, express or implied, is made.

Opinions contained in this report apply to conditions existing when the services were performed. All conclusions and recommendations are based on readily available and reasonably ascertainable information on site conditions at the time of the work and for the laws in effect at that time. We are not responsible for any changes in environmental standards, practices, or regulations subsequent to performance of services. This report is not meant to represent a legal opinion. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.

This report was prepared by:

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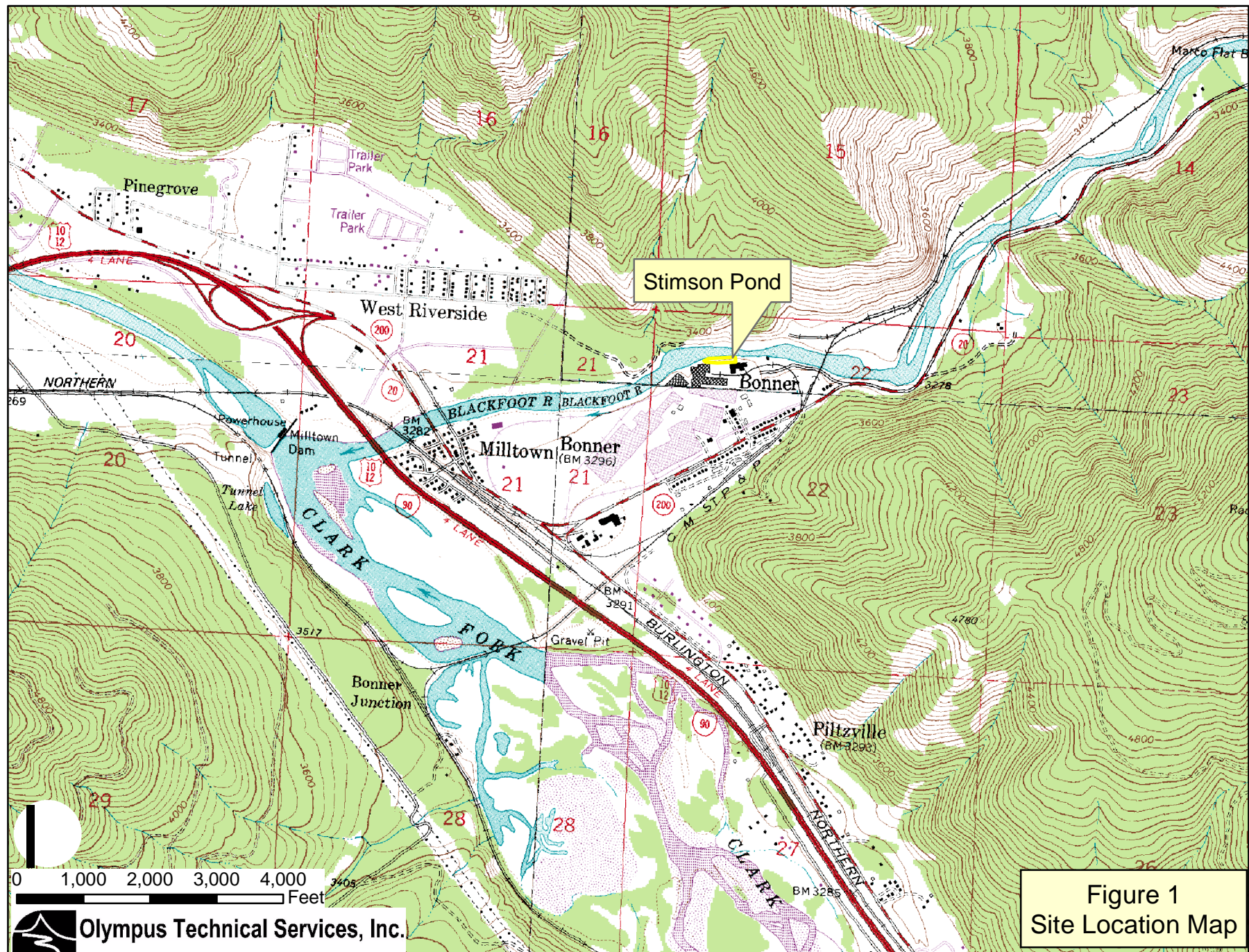
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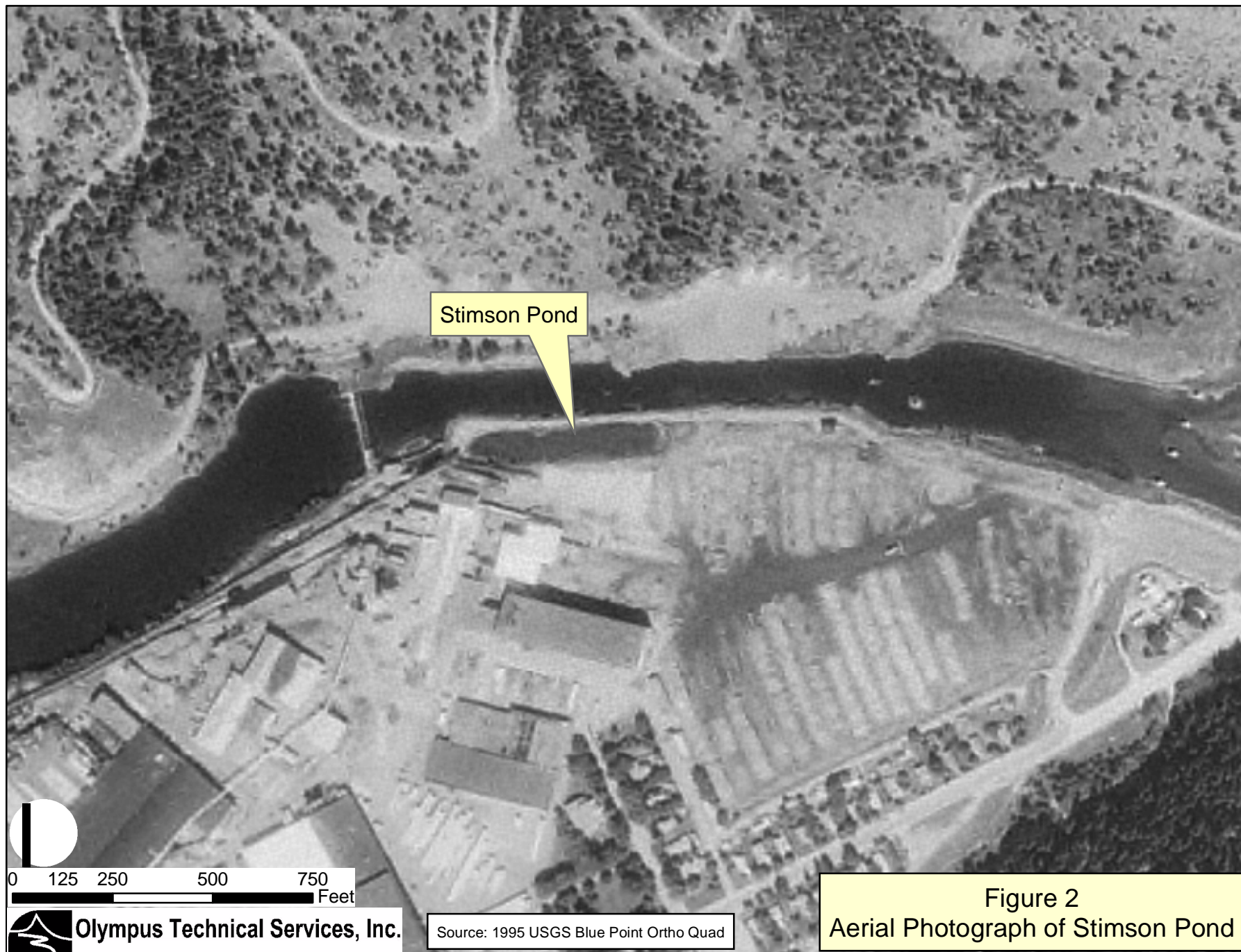
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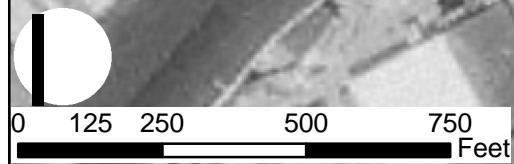
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FIGURES





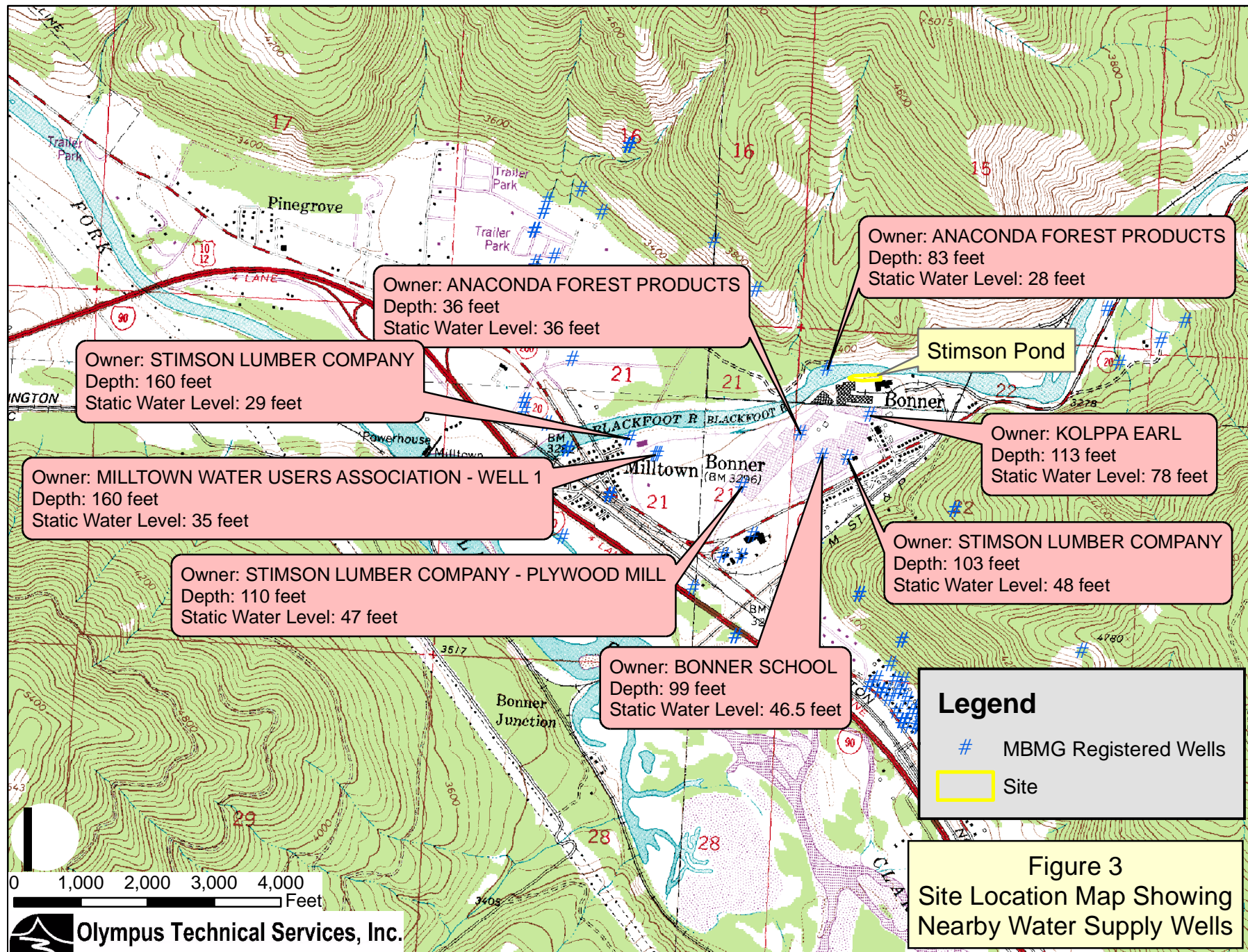
Stimson Pond



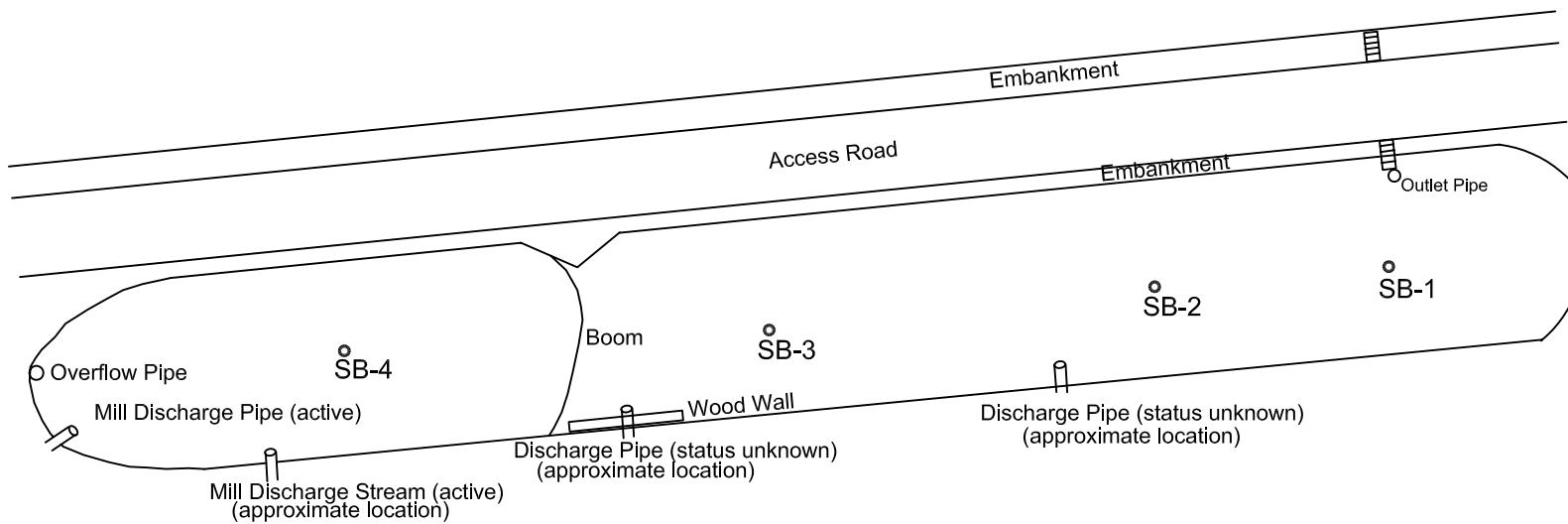
 **Olympus Technical Services, Inc.**

Source: 1995 USGS Blue Point Ortho Quad

Figure 2
Aerial Photograph of Stimson Pond



Blackfoot River



0 20 40 60 80 100
SCALE IN FEET



Olympus Technical Services, Inc.

Scale: As Shown
Job No: A1534
File: A1534Site.dwg

BORING LOCATION MAP
STIMSON POND

FIGURE
4

TABLES

TABLE 1. ANALYTICAL METHODS

Analysis or Analytical Suite	Analytical Method (1)
pH	ASA Mono. #9, Part 2, Method 29-3.5.2
Eh	Standard Methods 2580B
VPH	Mass. Method
EPH & EPH Screen	Mass. Method
VOCs	SW 8260B
SVOCs	SW 8270C
Organochlorine Pesticides	SW 8081A
PCBs	SW 8082
Chlorinated Herbicides	SW 8151A
Total Metals	SW 6010B/7471B
TCLP Metals	SW 1311/6010B/6020
TCLP Volatiles	SW 1311/SW 8260B
TCLP Pesticides	SW 1311/SW 8081A
TCLP Herbicides	SW 1311/SW 8151A

Table 2. Sample Field Information and Laboratory Analyses Performed

Field Information				Laboratory Analyses																		
Sample Identification	Collection Date	Soil Boring	Sampling/Representative Interval (Feet Below Water Surface)	Extractable Petroleum Hydrocarbons	Extractable Petroleum Hydrocarbons - Screen	Chlorinated Herbicides	Oxidation-Reduction Potential - Eh (Mv)	pH (standard units)	Polychlorinated Biphenols (PCBs)	Organochlorine Pesticides	Semivolatile Organic Compounds (SVOCs)	Total Metals	Volatile Organic Compounds (VOCs)	Volatile Petroleum Hydrocarbons	Moisture (%)	Reactivity	TCLP Herbicides	TCLP Metals	TCLP Pesticides	TCLP Semivolatile Organic Compounds	TCLP Volatile Organic Compounds	Comments
B1-S-1	28-Mar-06	B-1	9-11	●	●	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-	-	
B1-S-2	28-Mar-06	B-1	11-15	-	-	-	-	-	-	-	-	-	●	●	●	-	-	-	-	-	-	Sample split with Stimson; Stimson sample B1-S-2-D analyzed by Energy Laboratories
B1-S-3	28-Mar-06	B-1	15-17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
B1-S-4	28-Mar-06	B-1	17-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
B1-S-2/3/4	28-Mar-06	B-1	11-19	-	●	●	●	●	●	●	●	●	-	-	●	-	-	-	-	-	-	Laboratory composite of B1-S-2, B1-S-3, B1-S-4
B1-S-1/2/3/4	28-Mar-06	B-1	9-19	-	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●	●	Laboratory composite of B1-S-1, B1-S-2, B1-S-3, B1-S-4
B2-S-1	29-Mar-06	B-2	7.5-9.5	●	●	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-	-	
B2-S-2	29-Mar-06	B-2	9.5-13.5	●	●	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-	-	Sample split with Stimson; Stimson sample B2-S-2-D analyzed by Energy Laboratories
B2-S-3	29-Mar-06	B-2	13.5-15.5	-	-	-	-	-	-	-	-	-	●	●	●	-	-	-	-	-	-	
B2-S-4	29-Mar-06	B-2	15.5-17.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
B2-S-3/4	29-Mar-06	B-2	13.5-17.5	-	●	●	●	●	●	●	●	●	-	-	●	-	-	-	-	-	-	Laboratory composite of B2-S-3, B2-S-4
B2-S-1/2/3/4	29-Mar-06	B-2	7.5-17.5	-	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●	●	Laboratory composite of B2-S-1, B2-S-2, B2-S-3, B2-S-4
B3-S-1	29-Mar-06	B-3	7.5-11.5	●	●	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-	-	Sample split with Stimson; Stimson sample B3-S-1-D analyzed by Energy Laboratories
B3-S-2	29-Mar-06	B-3	11.5-13.5	●	●	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-	-	
B3-S-3	29-Mar-06	B-3	13.5-15.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
B3-S-4	29-Mar-06	B-3	15.5-17.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
B3-S-5	29-Mar-06	B-3	17.5-19.5	-	-	-	-	-	-	-	-	-	●	●	●	-	-	-	-	-	-	
B3-S-4/5	29-Mar-06	B-3	15.5-19.5	-	●	●	●	●	●	●	●	●	-	-	●	-	-	-	-	-	-	Laboratory composite of B3-S-4, B3-S-5
B3-S-1/2/3/4/5	29-Mar-06	B-3	7.5-19.5	-	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●	●	Laboratory composite of B3-S-1, B3-S-2, B3-S-3, B3-S-4, B3-S-5
B4-S-1	30-Mar-06	B4	3.5-7.5	●	●	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-	-	Sample split with Stimson; Stimson sample B4-S-1-D analyzed by Energy Laboratories
B4-S-2	30-Mar-06	B4	7.5-9.5	●	●	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-	-	
B4-S-3	30-Mar-06	B4	9.5-11.5	●	●	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-	-	
B4-S-4	30-Mar-06	B4	11.5-13.5	●	●	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-	-	
B4-S-5	30-Mar-06	B4	13.5-15.5	●	●	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-	-	
B4-S-6	30-Mar-06	B4	15.5-17.5	-	-	-	-	-	-	-	-	-	●	●	●	-	-	-	-	-	-	
B4-S-7	30-Mar-06	B4	17.5-19.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
B4-S-8	30-Mar-06	B4	19.5-21.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
B4-S-6/7/8	30-Mar-06	B4	15.5-21.5	-	●	●	●	●	●	●	●	●	-	-	-	-	-	-	-	-	-	Laboratory composite of B4-S-6, B4-S-7, B4-S-8
B4-S-1/2/3/4/5/6/7/8	30-Mar-06	B4	3.5-21.5	-	-	-	-	-	-	-	-	-	-	-	-	●	●	●	●	●	●	Laboratory composite of B4-S-1, B4-S-2, B4-S-3, B4-S-4, B4-S-5, B4-S-6, B4-S-7, B4-S-8
Rinsate Blank	30-Mar-06	B4	NA	●	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-	-	-	Preserved and unpreserved samples collected from wash rinsate of piston sampling tube

Notes:
● = Analyzed
- = Not Analyzed
NA = Not Available or Applicable
TCLP = Toxic Characteristic Leaching Procedure

Table 3. pH, Oxidation-Reduction Potential, VPH, and EPH Analytical Results

				VPH - Dry Weight										EPH - Dry Weight			
Sample Identification	pH (standard units)	Oxidation-Reduction Potential - Eh (Mv)	Moisture (%)	Methyl-tert-butyl ether (mg/Kg)	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethylbenzene (mg/Kg)	Total Xylenes (mg/Kg)	Naphthalene (mg/Kg)	C ₅ to C ₈ Aliphatics (mg/Kg)	C ₉ to C ₁₂ Aliphatics (mg/Kg)	C ₉ to C ₁₀ Aromatics (mg/Kg)	Total Purgeable Hydrocarbons (mg/Kg)	C ₉ to C ₁₈ Aliphatics (mg/Kg)	C ₁₉ to C ₃₆ Aliphatics (mg/Kg)	C ₁₁ to C ₂₂ Aromatics (mg/Kg) - unadjusted	Total Extractable Hydrocarbons - Screen (mg/Kg)
B1-S-1	7.2	140.2@20.3° C	64	<0.07	<0.03	<0.14	<0.14	<0.42	<0.69	<5	<14	<3	<28	<140	1,300	470	2,700
B1-S-2	-	-	53	<0.05	<0.03	0.49**	<0.11	<0.32	<0.53	<5	<11	<2	<21	-	-	-	-
B1-S-2-D	6.7	-	49.3	<0.2	<0.1	0.8	<0.1	<0.1	0.15J	<4	4.1	<4	7.3	45	1,112	260	2,525
B1-S-2/3/4	6.9	142.7@20.8° C	48	-	-	-	-	-	-	-	-	-	-	-	-	-	2,000
B2-S-1	7.1	66.3@21.5° C	63	<0.07	<0.03	<0.14	<0.14	<0.41	<0.68	<5	<14	<3	<27	<680	3,400	430	7,400
B2-S-2	7.1	106.4@22.4° C	71	<0.08	0.06J*	<0.17	<0.17	<0.50	<0.83	<5	<17	<3	<33	<170	2,100	400	4,400
B2-S-2-D	6.6	-	62.6	<0.27	<0.13	<0.13	<0.13	<0.13	<0.27	<5.3	<5.3	<5.3	<5.3	51J	1,596	534	2,275
B2-S-3	-	-	56	<0.06	<0.03	0.26**	<0.11	<0.34	<0.57	<5	<11	<2	<27	-	-	-	-
B2-S-3/4	6.6	101.6@23.1° C	48	-	-	-	-	-	-	-	-	-	-	-	-	-	570
B3-S-1	7.1	95.7@22.6° C	74	<0.10	<0.03	<0.19	<0.19	<0.58	<1	<5	<19	<4	<38	<190	1,200	190	2,100
B3-S-1-D	7.0	-	72.9	<0.37	<0.18	<0.18	<0.18	<0.18	<0.37	<7.4	<7.4	<7.4	<7.4	100	2,461	664	4,428
B3-S-2	7.0	117.8@23.6° C	76	<0.10	<0.04	<0.21	<0.21	<0.63	<1	<5	<21	<4	<42	<210	2,300	340	3,900
B3-S-5	-	-	77	<0.11	0.15*	<0.22	<0.22	<0.65	<1	<5	<22	<4	<43	-	-	-	-
B3-S-4/5	6.5	138.0@23.6° C	74	-	-	-	-	-	-	-	-	-	-	-	-	-	1,500
B4-S-1	6.9	-112@22° C	58	<0.06	<0.03	<0.12	<0.12	<0.36	<0.60	<5	<12	<2	<24	<120	780	180	1,600
B4-S-1-D	7.4	-	59.9	<0.25	<0.12	<0.12	<0.12	<0.12	<0.25	<5.0	<5.0	<5.0	<5.0	17.5J	1,449	376	3,241
B4-S-2	7.1	-1.5@21.0° C	61	<0.06	<0.03	<0.13	<0.13	<0.36	<0.64	<5	<12	<3	<26	<130	690	140	1,600
B4-S-3	7.2	58.1@21.6° C	61	<0.06	0.04J**	<0.13	<0.13	<0.38	<0.64	<5	<13	<3	<26	<650	2,100	490	5,900
B4-S-4	7.4	67.1@21.1° C	70	<0.08	<0.03	<0.17	<0.17	<0.50	<0.83	<5	<17	<3	<33	<170	1,800	400	4,200
B4-S-5	7.3	97.9@20.4° C	80	<0.13	<0.04	<0.25	<0.25	<0.75	<1	<5	<25	<5	<50	<250	2,000	370	4,200
B4-S-6	-	-	80	<0.13	<0.04	<0.25	<0.25	<0.75	<1	<5	<25	<5	<50	-	-	-	-
B4-S-6/7/8	7.1	52.1@20.3° C	57	-	-	-	-	-	-	-	-	-	-	-	-	-	950
Quality Assurance/Quality Control Sample Analyses																	
Rinstat Blank (mg/L)	6.2	195.6@25.0° C	-	<0.002	<0.001	<0.001	<0.001	<0.003	<0.005	<0.10	<0.10	<0.020	<0.20	-	-	-	<0.19
Project Screening Level																	
	<2 or >12.5	NA	NA	0.1	0.05	10	10	200	9	100	500	8	500	1,000	5,000	100	5,000

Notes:

mg/Kg = Milligrams per Kilogram

mg/L = Milligrams per Liter

- = Not measured or not analyzed

J = Estimated concentration; benzene is present in B2-S-2 at a concentration between the Method Detection Limit and the Laboratory Reporting Limit

* = Detected in the VPH analysis and not confirmed in the 8260B analysis; analyte concentration should be considered a false positive

** = Detected in the VPH analysis and confirmed in the 8260B analysis

Screening Levels = Screening levels for VPH and EPH are Montana Department of Environmental Quality Risk Based Screening Levels based on surface soil residential exposure; pH is a RCRA hazardous waste level

NA = Not available

Dry Weight: Duplicate sample concentrations for VPH and EPH reported by Energy Laboratories "as received" (wet weight); dry weight concentrations in Table 2 calculated by Olympus

Table 4. Volatile Organic Compounds Analytical Results

[illegible]

Table 4. Volatile Organic Compounds Analytical Results (continued)

	Volatile Organic Compounds																																	
Sample Identification	Ethylbenzene (mg/Kg)	Hexachlorobutadiene (mg/Kg)	Isopropylbenzene (Cumene) (mg/Kg)	Isopropyltoluene	Methylene chloride (mg/Kg)	Methyl-t-butyl ether (MTBE) (mg/Kg)	Naphthalene (mg/Kg)	n-propylbenzene (mg/Kg)	Styrene (mg/Kg)	1,1,1,2-Tetrachlorethane (mg/Kg)	1,1,2,2-Tetrachlorethane (mg/Kg)	Tetrachlorethene (mg/Kg)	Toluene (mg/Kg)	1,2,3-Trichlorobenzene (mg/Kg)	1,2,4-Trichlorobenzene (mg/Kg)	1,1,1-Trichloroethane (mg/Kg)	1,1,2-Trichloroethane (mg/Kg)	Trichloroethene (mg/Kg)	Trichlorofluoromethane (mg/Kg)	1,2,3-Trichloropropane (mg/Kg)	1,2,4-Trimethylbenzene (mg/Kg)	1,3,5-Trimethylbenzene (mg/Kg)	Vinyl acetate (mg/Kg)	Vinyl chloride (mg/Kg)	Xylenes (total) (mg/Kg)	Acrylonitrile (mg/Kg)	Carbon disulfide (mg/Kg)	Iodomethane (mg/Kg)	tert-1,4-Dichloro-2-butene (mg/Kg)	Ethylmethacrylate (mg/Kg)	Acetone (mg/Kg)	Methyl ethyl Ketone (2-Butanone) (mg/Kg)	4-Methyl-2-Pentanone (Methyl Isobutyl Ketone) (mg/Kg)	2-Hexanone (mg/Kg)
B1-S-1	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.15	<0.5	<0.05	<0.25	<0.5	<0.05	<0.5	<0.25	<0.25	<0.25
B1-S-2	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.29	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.15	<0.5	<0.05	<0.25	<0.5	<0.05	<0.5	<0.25	<0.25	<0.25
B2-S-2-D	<0.320	<0.320	<0.320	<0.320	<0.320	<0.320	<0.320	<0.320	<0.320	<0.320	<0.320	<0.320	<0.320	<0.320	<0.320	<0.320	<0.320	<0.320	<0.320	<0.320	<0.320	<0.320	<0.320	<0.320	<0.640	<6.4	<0.320	<0.320	NA	NA	<6.4	<6.4	<6.4	<6.4
B2-S-1	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.15	<0.5	<0.05	<0.25	<0.5	<0.05	<0.5	<0.25	<0.25	<0.25
B2-S-2	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.15	<0.5	<0.05	<0.25	<0.5	<0.05	<0.5	<0.25	<0.25	<0.25
B2-S-2-D	<0.332	<0.332	<0.332	<0.332	<0.332	<0.332	<0.332	<0.332	<0.332	<0.332	<0.332	<0.332	<0.332	<0.332	<0.332	<0.332	<0.332	<0.332	<0.332	<0.332	<0.332	<0.332	<0.332	<0.332	<6.64	<6.64	<0.332	<0.332	NA	NA	<6.64	<6.64	<6.64	<6.64
B2-S-3	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.18	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.15	<0.5	<0.05	<0.25	<0.5	<0.05	<0.5	<0.25	<0.25	<0.25
B3-S-1	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.15	<0.5	<0.05	<0.25	<0.5	<0.05	<0.5	<0.25	<0.25	<0.25
B3-S-1-D	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<4.00	<40.0	<2.00	<2.00	NA	NA	<40.0	<40.0	<40.0	<40.0
B3-S-2	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.15	<0.5	<0.05	<0.25	<0.5	<0.05	<0.70	<0.25	<0.25	<0.25
B3-S-5	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.15	<0.5	<0.05	<0.25	<0.5	<0.05	<0.5	<0.25	<0.25	<0.25
B4-S-1	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.15	<0.5	<0.05	<0.25	<0.5	<0.05	<0.5	<0.25	<0.25	<0.25
B4-S-1-D	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<4.00	<40.0	<2.00	<2.00	NA	NA	<40.0	<40.0	<40.0	<40.0
B4-S-2	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.15	<0.5	<0.05	<0.25	<0.5	<0.05	<0.5	<0.25	<0.25	<0.25
B4-S-3	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.15	<0.5	<0.05	<0.25	<0.5	<0.05	<0.5	<0.25	<0.25	<0.25
B4-S-4	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.15	<0.5	<0.05	<0.25	<0.5	<0.05	<0.5	<0.25	<0.25	<0.25
B4-S-5	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.15	<0.5	<0.05	<0.25	<0.5	<0.05	<0.5	<0.25	<0.25	<0.25
B4-S-6	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.15	<0.5	<0.05	<0.25	<0.5	<0.05	<0.5	<0.25	<0.25	<0.25
Quality Assurance/Quality Control Sample Analyses																																		
Rinsate Blank (mg/L)	<0.0005	<0.001	<0.001	<0.001	<0.005	<0.001	<0.005	<0.001	<0.0005	<0.001	<0.001	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.010	<0.0005	<0.002	<0.020	<0.005	<0.005	<0.010	<0.005	<0.020	<0.020	<0.020
Project Screening Level																																		
	10*	6.2	570	NA	9.1	0.1*	9*	240	1,700	3.2	0.41	0.48	10*	NA	62	1,200	0.73	0.053	390	71	52	21	430	0.079	200	0.21	360	NA	0.0079	140	1.4E+04	2.2E+04	5,300	NA

Notes:

mg/Kg = Milligrams per Kilogram

mg/L = Milligrams per Liter (Rinsate Blank)

- = Not measured or not analyzed

NA = Not available

VOC = Volatile Organic Compounds

Screening Levels = Screening levels for VOC are EPA Region 9 Preliminary Remediation Goals for residential soil with the exception of those noted with a *

* = Montana Department of Environmental Quality Risk Based Screening Levels (RBSL)

NA = Not available

Table 5. Semi-Volatile Organic Compounds Analytical Results

	Semivolatile Organic Compounds																																		
Sample Identification	Acenaphthene (mg/Kg)	Acenaphthylene (mg/Kg)	Anthracene (mg/Kg)	Benzo(a)anthracene (mg/Kg)	Benzo(a)Pyrene (mg/Kg)	Benzo(b)fluoranthene (mg/Kg)	Benzo(k)fluoranthene (mg/Kg)	Benzo(g,h,i)perylene (mg/Kg)	Benzoic acid (mg/Kg)	Benzyl alcohol (mg/Kg)	Bis(2-chloroethoxy) methane (mg/Kg)	Bis(2-chloroethyl)ether (mg/Kg)	Bis(2-chloroisopropyl)ether (mg/Kg)	Bis(2-ethylhexyl)phthalate (mg/Kg)	4-Bromophenylphenylether (mg/Kg)	Butyl benzyl phthalate (mg/Kg)	Carbazole (mg/Kg)	4-Chloroaniline (mg/Kg)	4-Chloro-3-methylphenol (mg/Kg)	2-Chloronaphthalene (mg/Kg)	2-Chlorophenol (mg/Kg)	4-Chlorophenyl-phenylether (mg/Kg)	Chrysene (mg/Kg)	Dibenzofuran (mg/Kg)	Dibenzo(a,h)anthracene (mg/Kg)	1,2-Dichlorobenzene (mg/Kg)	1,3-Dichlorobenzene (mg/Kg)	1,4-Dichlorobenzene (mg/Kg)	3,3'-Dichlorobenzidene (mg/Kg)	2,4-Dichlorophenol (mg/Kg)	Diethylphthalate (mg/Kg)	2,4-Dimethylphenol (mg/Kg)	Dimethylphthalate (mg/Kg)		
B1-S-1	<0.1	<0.1	<0.4	<0.6	<0.4	<0.2	<0.6	<0.6	<0.2	<0.1	<0.1	<0.2	<0.1	<2	<0.4	<0.6	<0.6	<0.5	<0.1	<0.1	<0.1	<0.1	<0.4	<0.1	<0.6	<0.1	<0.1	<0.1	<9	<0.1	<0.1	<0.1	<0.1		
B1-S-2-D	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	NA	NA	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	NA	NA	<0.33	<0.33	<0.33	<0.33	<0.33	NA	<0.33	<0.33	<0.33	<0.33	<0.67	<0.33	<0.33	<0.33	<0.33		
B1-S-2/3/4	<0.1	<0.1	<0.4	<0.6	<0.4	<0.2	<0.6	<0.6	<0.2	<0.1	<0.1	<0.2	<0.1	<2	<0.4	<0.6	<0.6	<0.5	<0.1	<0.1	<0.1	<0.1	<0.4	<0.1	<0.6	<0.1	<0.1	<0.1	<9	<0.1	<0.1	<0.1	<0.1		
B2-S-1	<0.1	<0.1	<0.4	<0.6	<0.4	<0.2	<0.6	<0.6	<0.2	<0.1	<0.1	<0.2	<0.1	<2	<0.4	<0.6	<0.6	<0.5	<0.1	<0.1	<0.1	<0.1	<0.4	<0.1	<0.4	<0.1	<0.4	<0.1	<0.1	<0.1	<9	<0.1	<0.1	<0.1	<0.1
B2-S-2	<0.1	<0.1	<0.4	<0.6	<0.4	<0.2	<0.6	<0.6	<0.2	<0.1	<0.1	<0.2	<0.1	<2	<0.4	<0.6	<0.6	<0.5	<0.1	<0.1	<0.1	<0.1	<0.4	<0.1	<0.6	<0.1	<0.1	<0.1	<9	<0.1	<0.1	<0.1	<0.1		
B2-S-2-D	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	NA	NA	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	NA	NA	<0.33	<0.33	<0.33	<0.33	<0.33	NA	<0.33	<0.33	<0.33	<0.33	<0.67	<0.33	<0.33	<0.33	<0.33		
B2-S-3/4	<0.1	<0.1	<0.4	<0.6	<0.4	<0.2	<0.6	<0.6	<0.2	<0.1	<0.1	<0.2	<0.1	<2	<0.4	<0.6	<0.6	<0.5	<0.1	<0.1	<0.1	<0.1	<0.4	<0.1	<0.6	<0.1	<0.1	<0.1	<9	<0.1	<0.1	<0.1	<0.1		
B3-S-1	<0.1	<0.1	<0.1	<0.6	<0.4	<0.2	<0.6	<0.6	<0.2	<0.1	<0.1	<0.2	<0.1	<2	<0.1	<0.6	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.4	<0.1	<0.6	<0.1	<0.1	<0.1	<9	<0.1	<0.1	<0.1	<0.1		
B3-S-1-D	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	NA	NA	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	NA	NA	<0.33	<0.33	<0.33	<0.33	<0.33	NA	<0.33	<0.33	<0.33	<0.33	<0.67	<0.33	<0.33	<0.33	<0.33		
B3-S-2	<0.1	<0.1	<0.4	<0.6	<0.4	<0.2	<0.6	<0.6	<0.2	<0.1	<0.1	<0.2	<0.1	<2	<0.4	<0.6	<0.6	<0.5	<0.1	<0.1	<0.1	<0.1	<0.4	<0.1	<0.6	<0.1	<0.1	<0.1	<9	<0.1	<0.1	<0.1	<0.1		
B3-S-4/5	<0.1	<0.1	<0.4	<0.6	<0.4	<0.2	<0.6	<0.6	<0.2	<0.1	<0.1	<0.2	<0.1	<2	<0.4	<0.6	<0.6	<0.5	<0.1	<0.1	<0.1	<0.1	<0.4	<0.1	<0.6	<0.1	<0.1	<0.1	<9	<0.1	<0.1	<0.1	<0.1		
B4-S-1	0.17J	1.2	0.21	<0.6	<0.4	<0.2	<0.6	<0.6	<0.2	<0.1	<0.1	<0.2	<0.1	<2	<0.1	<0.6	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.4	0.52	<0.6	<0.1	<0.1	<0.1	<9	<0.1	<0.1	<0.1	<0.1		
B4-S-1-D	<0.33	0.17J	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	NA	NA	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	NA	NA	<0.33	<0.33	<0.33	<0.33	<0.33	NA	<0.33	<0.33	<0.33	<0.33	<0.67	<0.33	<0.33	<0.33	<0.33		
B4-S-2	<0.1	0.25	<0.4	<0.6	<0.4	<0.2	<0.6	<0.6	<0.2	<0.1	<0.1	<0.2	<0.1	<2	<0.4	<0.6	<0.6	<0.5	<0.1	<0.1	<0.1	<0.1	<0.4	0.1J	<0.6	<0.1	<0.1	<0.1	<9	<0.1	<0.1	0.14J	<0.1		
B4-S-3	<0.1	0.29	<0.4	<0.6	<0.4	<0.2	<0.6	<0.6	<0.2	<0.1	<0.1	<0.2	<0.1	<2	<0.4	<0.6	<0.6	<0.5	<0.1	<0.1	<0.1	<0.1	<0.4	0.1J	<0.6	<0.1	<0.1	<0.1	<9	<0.1	<0.1	0.41	<0.1		
B4-S-4	<0.4	<0.4	<0.4	<0.6	<0.4	<0.2	<0.6	<0.6	<0.2	<0.1	<0.1	<0.2	<0.1	5.6	<0.4	<0.6	<0.6	<0.5	<0.1	<0.4	<0.1	<0.6	<0.4	<0.4	<0.6	<0.1	<0.1	<0.1	<9	<0.1	<1	<0.4	<0.4		
B4-S-5	<0.1	<0.1	<0.4	<0.6	<0.4	<0.2	<0.6	<0.6	<0.2	<0.1	<0.1	<0.2	<0.1	<2	<0.4	<0.6	<0.6	<0.5	<0.1	<0.1	<0.1	<0.1	<0.4	<0.1	<0.6	<0.1	<0.1	<0.1	<9	<0.1	<0.1	<0.1	<0.1		
B4-S-6/7/8	<0.1	<0.1	<0.1	<0.6	<0.4	<0.2	<0.6	<0.6	<0.2	<0.1	<0.1	<0.2	<0.1	<2	<0.1	<0.6	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.4	<0.1	<0.6	<0.1	<0.1	<0.1	<9	<0.1	<0.1	<0.1	<0.1		
Quality Assurance/Quality Control Sample Analyses																																			
Rinsate Blank (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.07	<0.01	<0.01	<0.01	<0.01		
Project Screening Level																																			
	200*	NA	4,000*	10*	3*	50*	500*	NA	1.0E+05	1.8E+04	NA	0.22	2.9	35	NA	1.2E+04	24	240	NA	4,900	63	NA	1,000*	150	6*	600	530	3.4	1.1	180	49000	1,200	100000		

Notes:

mg/Kg = Milligrams per Kilogram

mg/L = Milligrams per Liter (Rinsate Blank)

- = Not measured or not analyzed

J = Estimated concentration; analyte present in the sample at concentrations between the Method Detection Limit and the laboratory reporting limit

U = Undetected

UJ = Concentrations were not detected above the laboratory reporting limit; however, the reporting limit is imprecise or inaccurate

SVOC = Semivolatile Organic Compounds

Screening Levels = Screening levels for SVOC are EPA Region 9 Preliminary Remediation Goals for residential soil with the exception of those noted with a *

* = Montana Department of Environmental Quality Risk Based Screening Levels (RBSL)

NA = Not available

Table 5. Semi-Volatile Organic Compounds Analytical Results (continued)

Sample Identification	Semivolatile Organic Compounds																																					
	4,6-Dinitro-2-methylphenol (mg/Kg)	2,4-Dinitrophenol (mg/Kg)	Di-n-butyl phthalate (mg/Kg)	2,4-Dinitrotoluene (mg/Kg)	2,6-Dinitrotoluene (mg/Kg)	Di-n-octyl phthalate (mg/Kg)	Diphenylamine (mg/Kg)	1,2-Diphenylhydrazine as Azobenzene (mg/Kg)	Fluorene (mg/Kg)	Fluoranthene (mg/Kg)	Hexachlorobenzene (mg/Kg)	Hexachlorobutadiene (mg/Kg)	Hexachlorocyclopentadiene (mg/Kg)	Hexachloroethane (mg/Kg)	Indeno(1,2,3-cd)pyrene (mg/Kg)	Isophorone (mg/Kg)	2-Methylnaphthalene (mg/Kg)	2-Methylphenol o-cresol (mg/Kg)	3-Methylphenol and 4-Methylphenol (mg/Kg)	Naphthalene (mg/Kg)	2-Nitroaniline (mg/Kg)	3-Nitroaniline (mg/Kg)	4-Nitroaniline (mg/Kg)	Nitrobenzene (mg/Kg)	2-Nitrophenol (mg/Kg)	4-Nitrophenol (mg/Kg)	N-Nitrosodimethylamine (mg/Kg)	N-Nitrosodiphenylamine (mg/Kg)	N-Nitrosodi-n-propylamine (mg/Kg)	Pentachlorophenol (mg/Kg)	Phenanthrene (mg/Kg)	Phenol (mg/Kg)	Pyrene (mg/Kg)	Pyridine (mg/Kg)	1,2,4-Trichlorobenzene (mg/Kg)	2,4,5-Trichlorophenol (mg/Kg)	2,4,6-Trichlorophenol (mg/Kg)	
B1-S-1	<0.8	<1	<0.6	<0.1	<0.1	<0.8	<0.4	<0.1	<0.1	<0.4	<0.4	<0.1	<0.2	<0.1	<0.6	<0.1	<0.1	<0.1	0.29	0.18J	<0.1	<0.3	<0.3	<0.1	<0.1	<0.2	<0.1	<2	<0.1	<0.6	<0.4	<0.1	<0.4	<1	<0.1	<0.1	<0.1	
B1-S-2-D	<1.7	<1.7	<0.33	<0.33	<0.33	<0.33	NA	<0.33	<0.33	<0.33	<0.33	<0.33	<0.67	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	0.55J	NA	NA	NA	<0.33	<0.33	<1.7	<0.33	<0.33	<0.33	<1.7	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33
B1-S-2/3/4	<0.8	<1	<0.6	<0.1	<0.1	<0.8	<0.4	<0.1	<0.1	<0.4	<0.4	<0.1	<0.2	<0.1	<0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.3	<0.1	<0.1	<0.2	<0.1	<2	<0.1	<0.6	<0.4	<0.1	<0.4	<1	<0.1	<0.1	<0.1	
B2-S-1	<0.8	<1	<0.6	<0.1	<0.1	<0.8	<0.4	<0.1	<0.1	<0.4	<0.4	<0.1	<0.2	<0.1	<0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.3	<0.1	<0.1	<0.2	<0.1	<2	<0.1	<0.6	<0.4	<0.1	<0.4	<1	<0.1	<0.1	<0.1	
B2-S-2	<0.8	<1	<0.6	<0.1	<0.1	<0.8	<0.4	<0.1	<0.1	<0.4	<0.4	<0.1	<0.2	<0.1	<0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.3	<0.1	<0.1	<0.2	<0.1	<2	<0.1	<0.6	<0.4	<0.1	<0.4	<1	<0.1	<0.1	<0.1	
B2-S-2-D	<1.7	<1.7	<0.33	<0.33	<0.33	<0.33	NA	<0.33	<0.33	<0.33	<0.33	<0.33	<0.67	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	0.56J	NA	NA	NA	<0.33	<0.33	<1.7	<0.33	<0.33	<0.33	<1.7	0.068J	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	
B2-S-3/4	<0.8	<1	<0.6	<0.1	<0.1	<0.8	<0.4	<0.1	<0.1	<0.4	<0.4	<0.1	<0.2	<0.1	<0.6	<0.1	<0.1	<0.1	0.19J	<0.1	<0.1	<0.3	<0.3	<0.1	<0.1	<0.2	<0.1	<2	<0.1	<0.6	<0.4	<0.1	<0.4	<1	<0.1	<0.1	<0.1	
B3-S-1	<0.2	<1	<0.1	<0.1	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.2	<0.1	<0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.3	<0.1	<0.1	<0.2	<0.1	<2	<0.1	<0.6	<0.1	<0.1	<0.1UJ	<1	<0.1	<0.1	<0.1	
B3-S-1-D	<1.7	<1.7	<0.33	<0.33	<0.33	<0.33	NA	<0.33	<0.33	<0.33	<0.33	<0.33	<0.67	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	0.15J	NA	NA	NA	<0.33	<0.33	<1.7	<0.33	<0.33	<0.33	<1.7	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	
B3-S-2	<0.8	<1	<0.6	<0.1	<0.1	<0.8	<0.4	<0.1	<0.1	<0.4	<0.4	<0.1	<0.2	<0.1	<0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.3	<0.1	<0.1	<0.2	<0.1	<2	<0.1	<0.6	<0.4	<0.1	<0.4	<1	<0.1	<0.1	<0.1	
B3-S-4/5	<0.8	<1	<0.6	<0.1	<0.1	<0.8	<0.4	<0.1	<0.1	<0.4	<0.4	<0.1	<0.2	<0.1	<0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.3	<0.1	<0.1	<0.2	<0.1	<2	<0.1	<0.6	<0.4	<0.1	<0.4	<1	<0.1	<0.1	<0.1	
B4-S-1	<0.2	<1	<0.1	<0.1	<0.1	<0.8	<0.1	<0.1	<0.1	0.76	<0.2	<0.1	<0.2	<0.1	<0.6	<0.1	0.10J	<0.1	0.22	3.3	<0.1	<0.3	<0.3	<0.1	<0.1	<0.2	<0.1	<2	<0.1	<0.2	2.1	<0.1	0.59	<1	<0.1	<0.1	<0.1	
B4-S-1-D	<1.7	<1.7	<0.33	<0.33	<0.33	<0.33	NA	<0.33	<0.33	0.08J	<0.33	<0.33	<0.67	<0.33	<0.33	<0.33	<0.33	0.095J	0.39	1.3	NA	NA	NA	<0.33	<0.33	<1.7	<0.33	<0.33	<0.33	<1.7	0.19J	<0.33	0.082J	<0.33	<0.33	<0.33	<0.33	
B4-S-2	<0.8	<1	<0.6	<0.1	<0.1	<0.8	<0.4	<0.1	<0.1	0.41J	<0.4	<0.1	<0.2	<0.1	<0.6	<0.1	<0.1	<0.1	0.20	1.1	<0.1	<0.3	<0.3	<0.1	<0.1	<0.2	<0.1	<2	<0.1	<0.6	.54J	<0.1	<0.4	<1	<0.1	<0.1	<0.1	
B4-S-3	<0.8	<1	<0.6	<0.1	<0.1	<0.8	<0.4	<0.1	<0.1	0.42J	<0.4	<0.1	<0.2	<0.1	<0.6	<0.1	<0.1	<0.1	0.16J	1.1	<0.1	<0.3	<0.3	<0.1	<0.1	<0.2	<0.1	<2	<0.1	<0.6	0.60J	<0.1	0.46J	<1	<0.1	<0.1	<0.1	
B4-S-4	<0.8	<10UJ	<0.6	<0.6	<0.6	<0.8	<0.4	<0.1	<0.6	<0.4	<0.4	<0.1	<0.6	<0.1	<0.6	<0.1	<0.1	<0.1	<0.1	0.32	<0.4	<0.4	<0.6	<0.1	<0.1	<0.4	<0.1	<2	<0.1	<0.6	<0.4	<0.1	<0.4	<1	<0.1	<0.1	<0.4	
B4-S-5	<0.8	<1	<0.6	<0.1	<0.1	<0.8	<0.4	<0.1	<0.1	<0.4	<0.4	<0.1	<0.2	<0.1	<0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.3	<0.1	<0.1	<0.2	<0.1	<2	<0.1	<0.6	<0.4	<0.1	<0.4	<1	<0.1	<0.1	<0.1	
B4-S-6/7/8	<0.2	<1	<0.1	<0.1	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.2	<0.1	<0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.3	<0.1	<0.1	<0.2	<0.1	<2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Quality Assurance/Quality Control Sample Analyses																																						
Rinsate Blank (mg/L)	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.02	<0.05	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	
Project Screening Level																																						
	6.1	120	6,100	120	61	2,400	1,500	0.61	200*	1,000*	0.3	6.3	370	35	10	510	NA	3,100	310	9*	180	18	23	20	NA	NA	0.0095	99	0.069	3	NA	1.8E+04	5,000*	61	62	6,100	6.1	

Notes:

mg/Kg = Milligrams per Kilogram

mg/L = Milligrams per Liter (Rinsate Blank)

- = Not measured or not analyzed

J = Estimated concentration; analyte present in the sample at concentrations between the Method Detection Limit and the laboratory reporting limit

U = Undetected

UJ = Concentrations were not detected above the laboratory reporting limit; however, the reporting limit is imprecise or inaccurate

SVOC = Semivolatile Organic Compounds

Screening Levels = Screening levels for SVOC are EPA Region 9 Preliminary Remediation Goals for residential soil with the exception of those noted with a *

* = Montana Department of Environmental Quality Risk Based Screening Levels (RBSL)

NA = Not available

Table 6. Chlorinated Pesticides and Chlorinated Herbicides Analytical Results

Sample Identification	Pesticides																				Herbicides													
	Aldrin (mg/Kg)	alpha-BHC (mg/Kg)	beta-BHC (mg/Kg)	delta-BHC (mg/Kg)	Lindane (gamma-BHC) (mg/Kg)	alpha-Chlordane (mg/Kg)	gamma-Chlordane (mg/Kg)	4,4'-DDD (mg/Kg)	4,4'-DDE (mg/Kg)	4,4'-DDT (mg/Kg)	Dieldrin (mg/Kg)	Endosulfan I (mg/Kg)	Endosulfan II (mg/Kg)	Endosulfan sulfate (mg/Kg)	Endrin (mg/Kg)	Endrin Aldehyde (mg/Kg)	Heptachlor (mg/Kg)	Heptachlor epoxide (mg/Kg)	Methoxychlor (mg/Kg)	Toxaphene (mg/Kg)	2,4-D (mg/Kg)	2,4-DB (mg/Kg)	Dalapon (mg/Kg)	Dicamba	Dichlorprop (mg/Kg)	Dinoseb (mg/Kg)	MCPA (mg/Kg)	MCPP (mg/Kg)	Pentachlorophenol (mg/Kg)	Picloram (mg/Kg)	2,4,5-T (mg/Kg)	2,4,5-TP (mg/Kg)		
B1-S-1	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.14	<0.14	<0.14	<0.14	<0.14	<0.06	<0.14	<0.14	<0.14	<0.06	<0.06	<0.66	<1.3	<0.05	<0.10	<0.10	<0.02	<0.15	<0.1R	<20	<20	<0.01	<0.02	<0.01	<0.02		
B1-S-2-D	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.38	<0.17	<0.17	<1.2	<0.69	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.35	<17	<0.02	<0.05	<0.05	<0.005	<0.02	<0.02	<4.0	<4.0	<0.002	<0.01	<0.004	<0.004		
B1-S-2/3/4	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.14	<0.14	<0.14	<0.14	<0.06	<0.14	<0.14	<0.14	<0.14	<0.06	<0.06	<0.65	<1.3	<0.05	<0.10	<0.10	<0.02	<0.15	<0.1R	<20	<20	<0.01	<0.02	<0.01	<0.02		
B2-S-1	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.14	<0.14	<0.14	<0.14	<0.06	<0.14	<0.14	<0.14	<0.14	<0.06	<0.06	<0.64	<1.3	<0.05	<0.10	<0.10	<0.02	<0.15	<0.1R	<20	<20	<0.01	<0.02	<0.01	<0.02		
B2-S-2	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.07	<0.07	<0.07	<0.07	<0.07	0.38J+	<0.07	<0.07	<0.07	<0.07	0.041J	<0.03	<0.33	<0.66	<0.05	<0.10	<0.10	<0.02	<0.15	<0.1R	<20	<20	<0.01	<0.02	<0.01	<0.02	
B2-S-2-D	<0.17	<0.17	<0.17	<0.17	<0.17	<0.092	<0.64	<0.17	<0.63	<0.84	<2.2	<0.17	<0.17	<0.17	<0.17	<0.32	<0.17	<0.17	<1.3	<17	<0.02	<0.05	<0.05	<0.005	<0.02	<0.02	<4.0	<4.0	<0.002	<0.01	<0.004	<0.004		
B2-S-3/4	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.035	<0.035	<0.035	<0.035	<0.015	<0.035	<0.035	0.33J+	<0.035	<0.015	<0.015	<0.16	<0.33	<0.05	<0.10	<0.10	<0.02	<0.15	<0.1R	<20	<20	<0.01	<0.02	<0.01	<0.02		
B3-S-1	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.07	<0.07	<0.07	<0.07UJ	0.06+	<0.07	<0.07	<0.07	<0.07	<0.03	<0.03	<0.33	<0.66	<0.05	<0.10	<0.10	<0.02	<0.15	<0.1R	<20	<20	<0.01	<0.02	<0.01	<0.02		
B3-S-1-D	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<17	<0.02	<0.05	<0.05	<0.005	<0.02	<0.02	<4.0	<4.0	0.0028	<0.01	<0.004	<0.004		
B3-S-2	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.034	<0.034	<0.034	<0.034	<0.015	<0.034	<0.034	<0.034	<0.034	<0.015	<0.015	<0.16	<0.32	<0.05	<0.10	<0.10	<0.02	<0.15	<0.1R	<20	<20	<0.01	<0.02	<0.01	<0.02		
B3-S-4/5	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.036J+	<0.034	<0.034	<0.034	<0.015	<0.034	<0.034	0.18J+	<0.034	<0.015	<0.015	<0.16	<0.32	<0.05	<0.10	<0.10	<0.02	<0.15	<0.1R	<20	<20	<0.01	<0.02	<0.01	<0.02		
B4-S-1	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.07	<0.07	<0.07	<0.07	<0.03	<0.07	<0.07	<0.07	<0.07	<0.03	<0.03	<0.33	<0.66	<0.05	<0.10	<0.10	<0.02	<0.15	<0.1R	<20	<20	<0.01	<0.02	<0.01	<0.02		
B4-S-1-D	<0.0017	<0.0017	<0.0017	<0.0017	<0.002	<0.0017	<0.002	<0.0017	<0.0017	<0.0033	<0.010	<0.0017	<0.0017	<0.0022	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.0054	<0.17	<0.02	<0.05	<0.05	<0.005	<0.02	<0.02	<4.0	<4.0	0.0019J	<0.01	<0.004	<0.004	
B4-S-2	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.07	<0.07	<0.07	<0.07	<0.03	<0.07	<0.07	<0.07	<0.07	<0.03	<0.03	<0.32	<0.65	<0.05	<0.10	<0.10	<0.02	<0.15	<0.1R	<20	<20	<0.01	<0.02	<0.01	<0.02		
B4-S-3	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.07	<0.07	<0.07	<0.07	<0.03	<0.07	<0.07	<0.07	<0.07	<0.03	<0.03	<0.33	<0.66	<0.05	<0.10	<0.10	<0.02	<0.15	<0.1R	<20	<20	<0.01	<0.02	<0.01	<0.02		
B4-S-4	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.14	<0.14	<0.14	<0.14	<0.06	<0.14	<0.14	<0.14	<0.14	<0.06	<0.06	<0.66	<1.4	<0.05	<0.10	<0.10	<0.02	<0.15	<0.1R	<20	<20	<0.01	<0.02	<0.01	<0.02		
B4-S-5	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.07	<0.07	<0.07	<0.07	0.032+	<0.07	<0.07	<0.07	<0.07	<0.03	<0.03	<0.33	<0.66	<0.05	<0.10	<0.10	<0.02	<0.15	<0.1R	<20	<20	<0.01	<0.02	<0.01	<0.02		
B4-S-6/7/8	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.034	<0.034	<0.034	<0.034	<0.015	<0.034	<0.034	<0.034	<0.034	<0.015	<0.015	<0.16	<0.32	<0.05	<0.10	<0.10	<0.02	<0.15	<0.1R	<20	<20	<0.01	<0.02	<0.01	<0.02		
Quality Assurance/Quality Control Sample Analyses																																		
Rinsate Blank (mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.003UJ	<0.002	<0.003UJ	<0.001	<0.5	<0.5	<0.00005	<0.001	<0.005	<0.0001UJ	
Project Screening Level																																		
	0.029	NA	NA	NA	NA	1.6	1.6	2.4	1.7	1.7	0.03	370	370	NA	18	NA	0.11	0.053	310	0.44	690	490	1,800	1,800	NA	61	31	61	3	4,300	610	490		

Notes:

- mg/Kg = Milligrams per Kilogram
- mg/L = Milligrams per Liter (Rinsate Blank)
- = Not measured or not analyzed
- R = Analytical results are not reliable for Dinoseb
- J = Estimated value: concentrations of analyte obtained from columns on primary and confirmation chromatograms differ by more than 40%
- + = Positive identification of the compound is not possible due to similar columns in the standard chromatogram for an Aroclor 1254 pattern.
- J+ = As for + above, with concentrations of analyte obtained from columns on primary and confirmation chromatograms differ by more than 40%
- UJ = The dieldrin concentration of sample B3-S-1 has been footnoted with a UJ, indicating concentrations of were not detected above the reporting limit, but the reporting limit is imprecise or inaccurate.
- R = The recovery of dinoseb in the laboratory control sample did not meet the requirements of the quality insurance plan, and concentrations of dinoseb are not reported, but instead the qualifier R (rejected) is used, indicating the results are not reliable.
- Screening Levels = Screening levels for Pesticides and Herbicides are EPA Region 9 Preliminary Remediation Goals for residential soil
- NA = Not available

Table 7. PCBs and Total Metals Analytical Results

Sample Identification	PCBs - Dry Weight							Total Metals - Dry Weight																								
	Aroclor-1016 (mg/Kg)	Aroclor-1221 (mg/Kg)	Aroclor-1232 (mg/Kg)	Aroclor-1242 (mg/Kg)	Aroclor-1248 (mg/Kg)	Aroclor-1254 (mg/Kg)	Aroclor-1260 (mg/Kg)	Calcium (mg/Kg)	Magnesium (mg/Kg)	Potassium (mg/Kg)	Sodium (mg/Kg)	Aluminum (mg/Kg)	Antimony (mg/Kg)	Arsenic (mg/Kg)	Barium (mg/Kg)	Beryllium (mg/Kg)	Cadmium (mg/Kg)	Chromium (mg/Kg)	Copper (mg/Kg)	Cobalt (mg/Kg)	Iron (mg/Kg)	Lead (mg/Kg)	Manganese (mg/Kg)	Mercury (mg/Kg)	Molybdenum (mg/Kg)	Nickel (mg/Kg)	Selenium (mg/Kg)	Silver (mg/Kg)	Thallium (mg/Kg)	Vanadium (mg/Kg)	Zinc (mg/Kg)	
B1-S-1	<4.4	<4.4	<4.4	<4.4	<4.4	24	<4.4	19,600	3,490	920	1,760	4,270	<10	<10	317	<2	<2	<10	69	<10	7,590	20	300	<0.2	<10	<10	<10	<10	<5	<10	138	
B1-S-2-D	<3.3	<3.3	<3.3	<3.3	<3.3	22	<3.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
B1-S-2/3/4	<3.1	<3.1	<3.1	<3.1	<3.1	21	<3.1	6,450	4,410	1,300	660	7,580	<10	<10	236	<2	<2	<10	24	<10	10,300	13	134	<0.2	<10	<10	<10	<10	<5	15	58	
B2-S-1	<4.3	<4.3	<4.3	<4.3	<4.3	8.9	<4.3	46,900	7,140	990	1,620	5,990	<10	<10	526	<2	<2	10	183	<10	9,750	21	549	<0.2	<10	<10	<10	<10	<10	<5	<10	144
B2-S-2	<11	<11	<11	<11	<11	65	<11	6,860	4,110	1,400	1,430	8,570	<10	<10	197	<2	2	10	44	<10	7,710	16	168	<0.2	<10	<10	<10	<10	<10	<5	15	116
B2-S-2-D	<3.3	<3.3	<3.3	<3.3	<3.3	47	<3.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
B2-S-3/4	<6.3	<6.3	<6.3	<6.3	<6.3	36	<6.3	5,450	4,590	1,300	1,130	8,060	<10	<10	416	<2	<2	<10	68	<10	10,200	14	90	<0.2	<10	32	<10	<10	<5	15	54	
B3-S-1	<2.5	<2.5	<2.5	<2.5	<2.5	9.6	<2.5	49,300	4,740	950	2,510	5,560	<10	26	620	<2	<2	<10	82	<10	6,700	18	918	<0.2	<10	<10	<10	<10	<5	14	240	
B3-S-1-D	<3.3	<3.3	<3.3	<3.3	<3.3	4.1	<3.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
B3-S-2	<2.7	<2.7	<2.7	<2.7	<2.7	10	<2.7	9,060	2,520	710	2,300	4,160	<10	<10	188	<2	<2	<10	54	<10	5,350	15	295	<0.2	<10	<10	<10	<10	<5	<10	122	
B3-S-4/5	<5	<5	<5	<5	<5	33	<5	6,060	2,430	700	1,710	3,940	<10	<10	145	<2	<2	<10	20	<10	4,530	<10	99	<0.2	<10	<10	<10	<10	<5	<10	54	
B4-S-1	<0.16	<0.16	<0.16	<0.16	<0.16	0.55	<0.16	141,000	8,480	2,620	2,140	8,090	<10	35	1,890	<2	4	12	118	<10	9,680	30	3,010	<0.2	<10	<10	<10	<10	<5	10	626	
B4-S-1-D	<0.03	<0.03	<0.03	<0.03	<0.03	0.22	<0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
B4-S-2	<4.1	<4.1	<4.1	<4.1	<4.1	2.8J	<4.1	157,000	11,600	3,040	2,330	9,040	<10	19	1,650	<2	4	12	139	<10	9,470	29	2,740	<0.2	<10	<10	<10	<10	<5	11	471	
B4-S-3	<0.85	<0.85	<0.85	<0.85	<0.85	5.4	<0.85	116,000	14,400	2,290	1,680	8,190	<10	12	1,100	<2	<2	12	196	<10	11,700	26	1,150	<0.2	<10	12	<10	<10	<5	11	294	
B4-S-4	<2.2	<2.2	<2.2	<2.2	<2.2	15	<2.2	63,700	7,000	840	1,390	4,000	<10	<10	565	<2	<2	<10	176	<10	5,850	19	408	<0.2	<10	<10	<10	<10	<5	<10	191	
B4-S-5	<1.7	<1.7	<1.7	<1.7	<1.7	4.8	<1.7	35,900	4,110	860	1,630	3,760	<10	<10	330	<2	<2	<10	51	<10	4,560	12	400	<0.5	<10	<10	<10	<10	<5	<10	127	
B4-S-6/7/8	<0.74	<0.74	<0.74	<0.74	<0.74	4.0	<0.74	5,550	4,260	920	380	5,010	<10	<10	100	<2	<2	<10	17	<10	8,120	<10	86	<0.2	<10	<10	<10	<10	<5	17	42	
Quality Assurance/Quality Control Sample Analyses																																
Rinsate Blank (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<1	<1	<1	<1	<0.05	<0.003	<0.003	<0.005	<0.001	<0.0001	<0.001	0.002	<0.002	1.35	<0.003	0.016	<0.0002	<0.01	<0.02	<0.001	<0.003	<0.001	<0.05	<0.01	
Project Screening Level																																
	0.11	0.11	0.11	0.11	0.11	0.11	0.11	NA	NA	NA	NA	76,000	31	40*	5,400	150	37	210	3,100	900	23,000	400	1,800	23	390	1,600	390	390	5.2	78	23,000	

Notes:

mg/Kg = Milligrams per Kilogram

mg/L = Milligrams per Liter (Rinsate Blank)

- = Not measured or not analyzed

PCBs = Polychlorinated Biphenyls

Screening Levels = Screening levels for Total Metals and PCBs are EPA Region 9 Preliminary Remediation Goals for residential soil with the exception of arsenic

* = DEQ Action Level for arsenic

NA = Not available

Dry Weight: Duplicate sample concentrations for PCBs reported by Energy Laboratories "as received" (wet weight); dry weight concentrations in Table 6 calculated by Olympus

Table 8. RCRA Characteristics Analytical Results

	Metals								Volatile Organic Compounds												Semivolatile Organic Compounds										Pesticides								Herbicides			
Sample Identification	Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Lead (mg/L)	Mercury (mg/L)	Selenium (mg/L)	Silver (mg/L)	Benzene (mg/L)	Carbon Tetrachloride (mg/L)	Chlorobenzene (mg/L)	Chloroform (mg/L)	1,4-Dichlorobenzene (mg/L)	1,2-Dichloroethane (mg/L)	1,1-Dichloroethene (mg/L)	Methyl ethyl ketone (mg/L)	Tetrachloroethylene (mg/L)	Trichloroethylene (mg/L)	Vinyl Chloride (mg/L)	Total Cresols (mg/L)	1,4-Dichlorobenzene (mg/L)	2,4-Dinitrotoluene (mg/L)	Hexachlorobutadiene (mg/L)	Hexachlorobenzene (mg/L)	Hexachloroethane (mg/L)	Nitrobenzene (mg/L)	Pyridine (mg/L)	Pentachlorophenol (mg/L)	2,4,5-Trichlorophenol (mg/L)	2,4,6-Trichlorophenol (mg/L)	Chlordane (mg/L)	Lindane (G-BHC) (mg/L)	Endrin (mg/L)	Heptachlor (mg/L)	Heptachlor epoxide (mg/L)	Methoxychlor (mg/L)	Toxaphene (mg/L)	2,4-D (mg/L)	2,4,5-TP (mg/L)	Reactivity - Cyanide as HCN (mg/L)	Reactivity - Sulfide as H ₂ S (mg/L)	
B1-S-1/2/3/4	<0.5	2.1	<0.1	<0.1	<0.5	<0.001	<0.5	<0.2	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.08	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.2	<0.2	<0.04	<0.04	<0.01	UJ	<0.05	<0.005	<0.002	<0.002	<0.5	<0.1	<0.1	<0.01	<0.1	<100
B2-S-1/2/3/4	<0.5	2.1	<0.1	<0.1	<0.5	<0.001	<0.5	<0.2	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.08	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.2	<0.2	<0.04	<0.04	<0.01	UJ	<0.05	<0.005	<0.002	<0.002	<0.5	<0.1	<0.1	<0.01	<0.1	<100
B3-S-1/2/3/4/5	<0.5	2.0	<0.1	<0.1	<0.5	<0.001	<0.5	<0.2	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.08	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.2	<0.2	<0.04	<0.04	<0.01	UJ	<0.05	<0.005	<0.002	<0.002	<0.5	<0.1	<0.1	<0.01	<0.1	<100
B4-S-1/2/3/4/5/6/7/8	<0.5	4.5	<0.1	<0.1	<0.5	<0.001	<0.5	<0.2	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.08	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.2	<0.2	<0.04	<0.04	<0.01	UJ	<0.05	<0.005	<0.002	<0.002	<0.5	<0.1	<0.1	<0.01	<0.1	<100
Project Screening Level	5.0	100	1.0	5.0	5.0	0.2	1.0	5.0	0.5	0.5	100	6	7.5	0.5	0.7	0.7	0.7	0.5	0.2	200	7.5	0.13	0.5	0.13	3.0	100	5.0	100	400	2	0.03	0.4	0.02	0.008	0.008	10	0.5	10	1	250	500	

Notes:

mg/L = Milligrams per Liter

- = Not measured or not analyzed

UJ = The analyte was not detected above the reported sample quantitation limit; however, the reported quantitation limit is approximate and may be inaccurate or imprecise

TCLP = Toxicity Characteristic Leaching Procedure

Screening Levels = Screening levels are the regulatory limit for designation as a Hazardous Waste

APPENDIX C

SOIL BORING LOGS

SOIL BORING LOG
Stimson Cooling Pond
Bonner, Montana



Boring ID: B-1			Surface Elevation: 3,270		Contractor: Salisbury	
Drilling	Start	Finish	Sample Device: Shelby Tube/Split Spoon		Driller: Keith Becker	
Time	11:30	16:00	Device Size: 2"x 24" / 2"x 18" or 2"x 24"		Method: Diamond Core	
Date	28-Mar-06	28-Mar-06	Logged By: Fritz Durham		Rig: Saitech Viper	
Depth (feet)	Blow Count	Recovery (inch)	Sample Description (Classifications by ASTM D 2488-90)		Observations	Lithology
8.0					Base of Cooling Pond	
9.0	NA	18	MH: Silt with some clay and peat; Dark brown, wet, very soft, moderately plastic. Stratification: clay/silt fraction at 9 to 10 feet.		PID = 0.1 PPM	
9.5					Organic material -	
10.0					apparent wood fiber	
10.5					and chips	
11.0	NA	22	PT: Peat with some clay/silt; Dark brown, moist, very soft, slightly plastic. Stratification: None		Organic material -	
11.5					apparent wood fiber	
12.0					and chips	
12.5						
13.0	NA	20	PT: Peat with some clay/silt; Dark brown, moist, very soft, nonplastic. Stratification: None		Organic material -	
13.5					apparent wood fiber	
14.0					and chips	
14.5						
15.0	NA	20	PT: Peat with some clay/silt; Dark brown, moist, very soft, nonplastic. Stratification: 3-inch moderately plastic silt/clay layer at 16.5 feet		Organic material -	
15.5					apparent wood fiber	
16.0					and chips	
16.5						
17.0	NA	NA	PT: Peat with some clay/silt, few sand, trace gravel; Dark brown, moist, soft, nonplastic. Stratification: some <2-inch slightly plastic silt/clay layers.		Organic material -	
17.5					apparent wood fiber	
18.0					and chips	
18.5						
19.0	NA	4	PT: Peat with little clay/silt; Dark brown, moist, nonplastic. 3-inch wood plug in nose of split spoon		Organic material -	
19.5					apparent wood fiber	
20.0					and chips	
20.5					2" x 18" split spoon	
21.0	2	2	PT: Peat with some gravel; Dark brown, wet, nonplastic, gravel to 1/2-inch.		Organic material -	
21.5					wood chips	
22.0					2" x 18" split spoon	
22.5						
23.0	6	2	PT: Peat with some gravel; Dark brown, wet, nonplastic, gravel to 1/2-inch.		Organic material -	
23.5					wood chips	
24.0					2" x 24" split spoon	
24.5						
25.0			Sampling terminated at 25 feet; Boring terminated at 23 feet Shelby tubes used for sample collection from 9 to 19.5 feet Split spoon used for sample collection 19.5 to 25 feet			

SOIL BORING LOG
Stimson Cooling Pond
Bonner, Montana



Boring ID: B-2			Surface Elevation: 3,270		Contractor: Salisbury	
Drilling	Start	Finish	Sample Device: Shelby Tube/Split Spoon		Driller: Keith Becker	
Time	8:45	11:30	Device Size: 2"x 24" / 2"x 24"		Method: Diamond Core	
Date	29-Mar-06	29-Mar-06	Logged By: Fritz Durham		Rig: Saitech Viper	
Depth (feet)	Blow Count	Recovery (inch)	Sample Description (Classifications by ASTM D 2488-90)		Observations	Lithology
7.0					Base of Cooling Pond	
7.5	NA	22	PT: Peat with some clay/silt; Dark brown, wet, soft, nonplastic. Stratification: None.		Organic material - apparent wood fiber and chips	
8.0						
8.5						
9.0						
9.5	NA	24	PT: Peat with some clay/silt; Dark brown, wet, soft, nonplastic. Stratification: None.		Organic material - apparent wood fiber and chips	
10.0						
10.5						
11.0						
11.5	NA	24	PT: Peat with some clay/silt; Dark brown, moist, soft, slightly plastic. Stratification: moderately plastic silt/clay layer at 13 feet.		Organic material - apparent wood fiber and chips	
12.0						
12.5						
13.0						
13.5	NA	20	PT: Peat with some clay/silt; Dark brown, wet, soft, nonplastic. Stratification: None.		Organic material - apparent wood fiber and chips	
14.0						
14.5						
15.0						
15.5	NA	10	PT: Peat with little clay/silt; Dark brown, wet, soft, nonplastic. Stratification: None.		Organic material - apparent wood fiber and chips	
16.0						
16.5						
17.0						
17.5	10	2	GP: Gravel; light grey, wet, nonplastic, gravel to 1".		Apparent broken cobble	
18.0						
18.5						
19.0						
19.5	6	5	GP: Gravel; light grey, wet, nonplastic, gravel to 1".		Apparent broken cobble	
20.0						
20.5						
21.0						
21.5			Sampling terminated at 21.5 feet; Boring terminated at 19.5 feet Shelby tubes used for sample collection from 7.5 to 17.5 feet Split spoon used for sample collection 17.5 to 21.5 feet			

SOIL BORING LOG
Stimson Cooling Pond
Bonner, Montana



Boring ID: B-3			Surface Elevation: 3,270		Contractor: Salisbury		
Drilling	Start		Finish		Sample Device: Shelby Tube/Split Spoon		
Time	12:30		15:00		Driller: Keith Becker		
Date	29-Mar-06		29-Mar-06		Device Size: 2"x 24" / 2"x 24"		
					Method: Diamond Core		
					Rig: Saitech Viper		
Depth (feet)	Blow Count	Recovery (inch)	Sample Description (Classifications by ASTM D 2488-90)			Observations	Lithology
7.0						Base of Cooling Pond	
7.5	NA	24	PT: Peat with some clay/silt; Dark brown, wet, soft, nonplastic. Stratification: None.			Organic material - apparent wood fiber and chips	
8.0							
8.5							
9.0							
9.5	NA	22	PT: Peat with some clay/silt; Dark brown, wet, soft, nonplastic. Stratification: None.			Organic material - apparent wood fiber and chips	
10.0							
10.5							
11.0							
11.5	NA	20	PT: Peat with little clay/silt; Dark brown, wet, soft, nonplastic. Stratification: None.			Organic material - apparent wood fiber and chips	
12.0							
12.5							
13.0							
13.5	NA	13	PT: Peat with few clay/silt; Dark brown, wet, soft, nonplastic. Stratification: None.			Organic material - apparent wood fiber and chips; >90%	
14.0							
14.5							
15.0							
15.5	NA	12	PT: Peat; Dark brown, wet, soft, nonplastic. Stratification: None.			Organic material - apparent wood fiber and chips; >90%	
16.0							
16.5							
17.0							
17.5	NA	12	PT: Peat with little clay/silt; Dark brown, wet, soft, nonplastic. Stratification: None.			Organic material - apparent wood fiber and chips	
18.0							
18.5							
19.0							
19.5	2 50R	0	No sample recovery				
20.0							
20.5							
21.0							
21.5			Sampling terminated at 21.5 feet; Boring terminated at 19.5 feet Shelby tubes used for sample collection from 7.5 to 19.5 feet Split spoon used for sample collection 19.5 to 21.5 feet				

SOIL BORING LOG
Stimson Cooling Pond
Bonner, Montana



Boring ID: B-4			Surface Elevation: 3,270		Contractor: Salisbury
Drilling	Start	Finish	Sample Device: Shelby Tube/Split Spoon		Driller: Keith Becker
Time	8:30	11:30	Device Size: 2"x 24" / 2"x 24"		Method: Diamond Core
Date	30-Mar-06	30-Mar-06	Logged By: Fritz Durham		Rig: Saitech Viper
Depth (feet)	Blow Count	Recovery (inch)	Sample Description (Classifications by ASTM D 2488-90)	Observations	Lithology
3.0				Base of Cooling Pond	
3.5 4.0 4.5 5.0	NA	20	ML: Silt with clay; Black, wet, very soft, fine grained, poorly graded, plasticity not determined. Stratification: None.	Slight organic odor; no wood fibers or chips	
5.5 6.0 6.5 7.0	NA	24	ML: Silt with clay and little peat; Black, wet, very soft, fine grained, poorly graded, plasticity not determined. Stratification: None.	Little wood fibers or chips	
7.5 8.0 8.5 9.0	NA	24	ML: Silt with clay and little peat; Black, wet, soft, fine grained, poorly graded, moderate plasticity in clay layers. Stratification: few white mottled layers/lenses and 2" to 3" clay layers.	Little wood fibers or chips	
9.5 10.0 10.5 11.0	NA	24	ML: Silt with clay; Black, wet, very soft, fine grained, poorly graded, moderate plasticity in clay layers. Stratification: few 2" to 3" clay layers.	No wood chips	
11.5 12.0 12.5 13.0	NA	20	ML-PT: Silt with clay and peat; Black, wet, soft, poorly graded, moderate plasticity in silt/clay layers. Stratification: silt/clay to 12.5 feet, wood chips/fibers from 12.5 to 13.5 feet.	Organic material - apparent wood fiber and chips	
13.5 14.0 14.5 15.0	NA	20	PT: Peat with little clay/silt; Dark brown, wet, soft, nonplastic. Stratification: None.	Organic material - apparent wood fiber and chips; >80%	
15.5 16.0 16.5 17.0	NA	12	PT: Peat with little clay/silt; Dark brown, wet, soft, nonplastic. Stratification: None.	Organic material - apparent wood fiber and chips	
17.5 18.0 18.5 19.0	NA	6	PT: Peat with little clay/silt; Dark brown, wet, very soft, nonplastic. Stratification: None.	Organic material - apparent wood fiber and chips; organic/sewage odor	
19.5 20.0 20.5 21.0	12 36 2 6	5	SP: Sand; Brown, wet, soft, poorly graded, very fine to fine grained sand, nonplastic. Stratification: None.		
21.5 22.0 22.5 23.0	NA	0	Split spoon sample attempt unsuccessful.	Obstruction (rock) in boring casing.	
23.5			Sampling terminated at 21.5 feet; Boring terminated at 21.5 feet Shelby tubes used for sample collection from 3.5 to 19.5 feet Split spoon used for sample collection 19.5 to 21.5 feet		